

Rock Products

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Plant of the New Kandos Cement Company, Australia

Coal, Limestone and Shale Deposits Are Part of Development—Largely American Equipment

By F. S. Richards

Superintendent, Kandos Cement Co., 1916-23

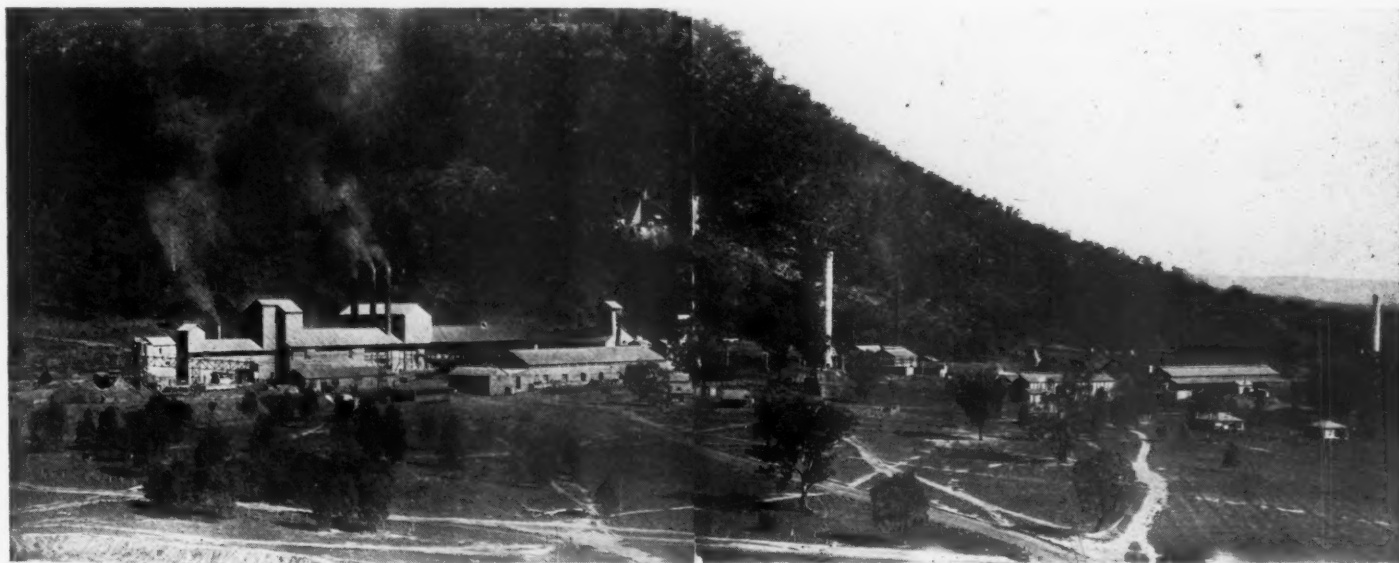
SEVERAL YEARS before the founding of the Kandos Cement Co., F. Oakden of New Zealand, reported on available properties in New South Wales, Australia, for the state government, selecting Kandos as the location of a state cement plant. The idea was abandoned owing to his refusal to recommend the location of a plant at Sydney, 153 miles southeast of the best available raw materials.

selection of mill machinery being Krupp), were forced to buy a second unit of English and American machines. The grinding machines of this first unit were 6x30 ft. Krupp compeb mills and the second unit mills were built by Edgar Allen of England following the outline of the Krupp mills, being the first large English mills, although a smaller type had been produced for several years. At the date of ordering the Krupp 6x30-ft.

having been interned while en route to Australia.

The property is unique in that it contains coal, shale, and limestone in large quantities and of excellent quality.

The plant, located on the Mudgee division of the New South Wales government railways, is at the foot of Coombu mountain, an outcrop of the upper and lower series of Marine sandstones, coal measures



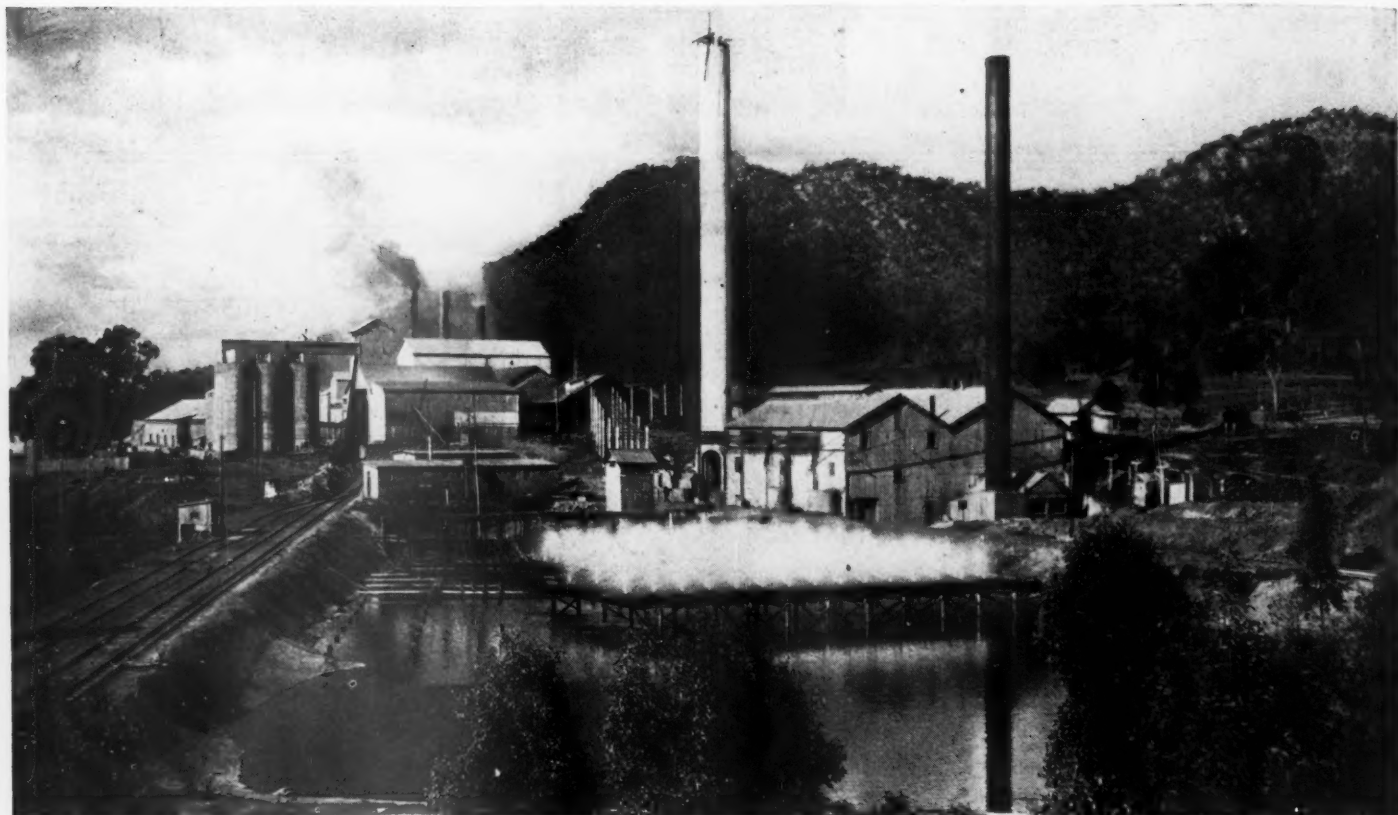
Plant of the Kandos Cement Co., Australia, with Coombu mountain in the background. The mountain contains the company's coal mines and the quarry from which the shale is obtained

In 1913 Mr. Oakden's services were secured by a group of New South Wales business men to plan and erect a one-kiln plant on the site formerly selected, their intention being to sell the erected plant to the state. War conditions intervened and the company, with part of its equipment landed, part interned in Portugal (the first

mills very few were running in Germany and no similar mills were in use in the United States.

With the arrival of the second unit in Australia the writer's services were secured through H. S. Spackman, consulting engineer, Philadelphia, to assist with the operation, the original operator, an Austrian,

and shales, rising 1300 ft. above the plant. Three workable seams of coal are available. The one worked is 8 ft. thick and is 300 ft. above the plant. The company holds over 4000 acres. An ash content of 10½ per cent and B.t.u. of 12,500 makes it excellent steam and kiln coal. Board and pillar workings produce 500 tons daily, which is screened



End view of the plant and cooling pond. All the buildings are of steel and concrete and the whole plant layout exemplifies the most modern practice. The site is almost ideal both in respect to plant layout and the nearness of the supply of raw materials



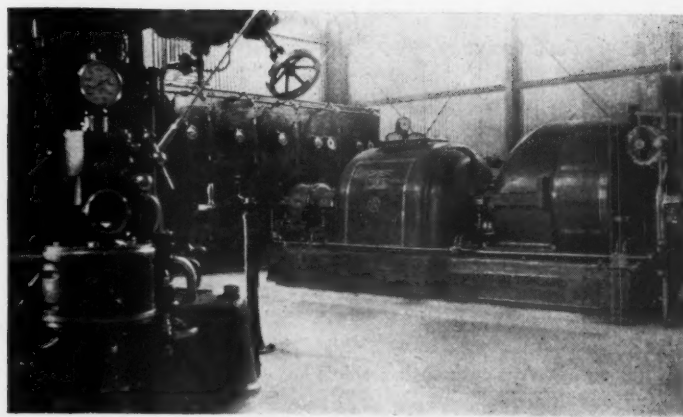
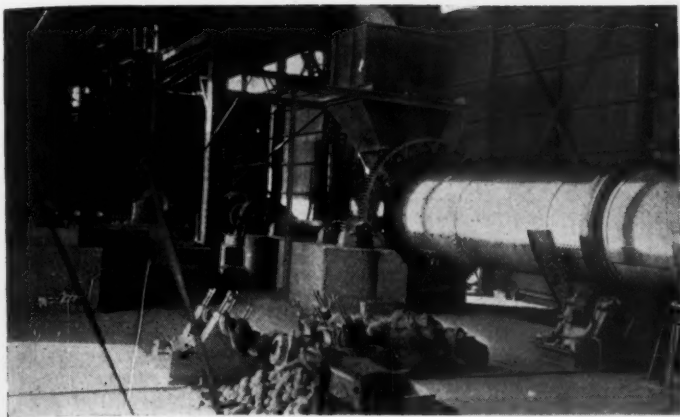
The limestone used is black marble. The deposit is 300 ft. thick with practically no overburden. Enough is in sight to last for centuries



The quarry face varies from 150 to 50 ft. This shows one of the lower faces just after a big shot had been touched off



Six tons of stone are secured from each pound of powder. Holes are drilled with a 6-in. bit and loaded with a 50 per cent powder



Left: A 6x30-ft. compeb mill of English make. Right: A corner of the power house showing turbo-generator. There are four of these in the power installation



Left: Four of the 140-ft. kilns which are fired with powdered coal and have waste heat boilers attached. Right: Loading cement. Note the use of open-top cars, which is possible in a dry country



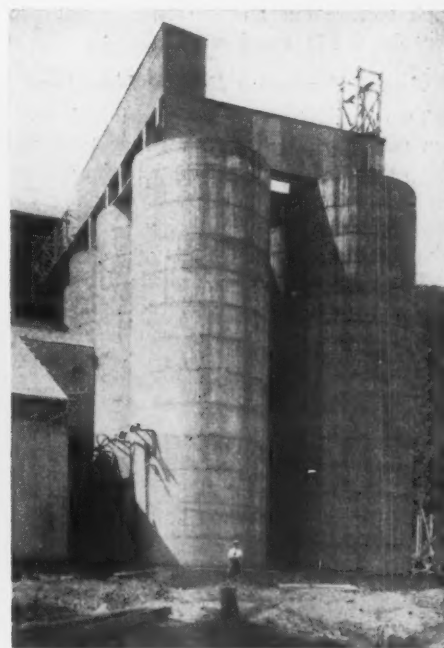
One of the two sackers used

over shaking screens and the large coal shipped for railway and industrial purposes, while the small coal is crushed to $\frac{3}{4}$ in., then sent to plant and power house bunkers with a rope-hauled industrial train.

The shale directly below the coal measures is several hundred feet thick, of ex-



Transmission line to quarry and aerial tramway which brings in the lime from the quarry, three miles from the plant. The cost of this transportation is given as 4 cents per ton mile



Storage silos, 400 tons each

tremely uniform character, analyzing SiO_2 , 65.2; Al_2O_3 , 17.6; Fe_2O_3 , 4.2. This is delivered to the plant under contract by horse carts constituting about 10 per cent of the raw charge.

The limestone (a black marble) outcropping to a height of 300 ft. without over-

burden, lies three miles west of the plant across broken country requiring aerial tramway transport.

Enough raw materials are in sight to last for several centuries.

The quarry face varies from 50 to 150 ft. in height at present, is drilled to below floor level with Armstrong and Overall McCray blast-hole drills (6-in. bits are used) and an average of six tons of stone are secured per pound of explosive (Cape Gelignite 50 per cent) used. Cordeau-Bickford detonating fuse is used. This is the only quarry in Australia using this type of drilling and blasting.

The quarry is equipped with compressed air for tripod drills and jackhammers when needed; a Bucyrus 68C electric shovel on caterpillars; electric trolley locomotives and 10-yd. standard-gauge dump cars working on a circular track running on an easy down grade through the crusher house, constitute the rest of the quarry equipment. Here an electric hoist mounted on a traveling crane traversing the crusher building tips the cars onto the feeder of a 48x60-in. Traylor jaw crusher. A 48-in. belt inclined conveyor carries the crushed stone into a 60-in. Williams swing hammer mill, reducing the stone to under 1-in. A 36-in. belt, also inclined, carries the discharge of this mill over the loading bunkers of the two aerial tramways. All buildings, conveyors and bunkers are of concrete and steel. Power is received at the quarry at 5600 v. and transformed to 440 v. for use. A motor generator set with a 350-hp., 5600-v. synchronous motor receives the power from the high voltage line and furnishes direct current for the locomotives.

Aerial Tramways Deliver Limestone

Two aerial tramways, the original a 35-ton per hour English, single-rope type, and the second of similar type but Australian, built of Australian materials, carrying 120 tons per hour, are delivering stone to the plant at less than 4 cents per ton mile. Delivery at the plant is made from gantrys over concrete tunnels containing belt-conveyors, so that stone can be handled for several days from storage without additional labor.



The shale quarry. The shale is directly under the coal measures mined for fuel and has a thickness of several hundred feet

Shale and stone are elevated to large concrete hoppers over batch scales which discharge into a feeding hopper from which a belt and elevator feed two 5x70-ft. dryers. These dryers are set with large Dutch oven furnaces and extra large dust chambers with fan controlled draft. Dried material is elevated, then distributed into mill hoppers by a Jeffry conveyor. Four 6x30-ft. compeb mills grind to a uniform fineness of 92 per cent through the 200-mesh. These mills are charged with English steel balls and Jeffry manganoids. The mills originally provided with single diaphragms discharging through interchange plates have been refitted with double diaphragms of the center discharge type, overcoming the discharge of coarse nibs and increasing the output. Ten silos are provided for storage of raw meal, each fitted with double tube screw extractors.

Four kilns 140 ft. long, one 7 ft. 8 in., two 8 ft. and one 9 ft. diameter, are set with large dust chambers automatically

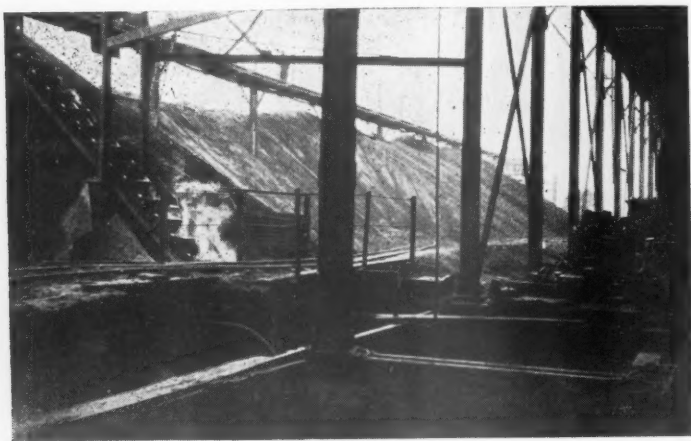
kept cleared of dust and arranged to be connected to waste-heat boilers. Coal is supplied by three small compeb mills after being dried in a double-tube dryer.

Clinker Storage and Recovery

Clinker is discharged direct into a Jeffry conveyor, which elevates and discharges into a distributing conveyor over the clinker storage of 20,000 tons. A belt reclaims clinker as required for grinding, being aided to collect the sides of the storage by a 15-ton electric tractor crane with $\frac{3}{4}$ -yd. bucket. Two 6 ft. 6 in. by 36 ft. English compeb mills, with four compartments, grind the clinker to meet British standard fineness (see accompanying government test sheet).

Bulk cement is stored in silos of 400 tons' capacity each and extracted mechanically to feed two double tube Bates bag-packing machines.

Bags are all of jute, three to the barrel, 125½ lbs. each. These are sewn across the



Left: A part of the clinker storage. Right: A corner of Lloyds dam which was erected to provide water storage



Stone storage showing gantrys at the end of the cableway

top and the valve formed in the top. A single-thread chain stitch being used, permitting of easy opening. Loading is almost entirely into open cars covered with tarpaulins. These range from 6 to 40 tons' capacity, with a 16-ton predominating.

Power Plant and Equipment

Power is provided by a battery of four Babcock & Wilcox boilers, with superheaters, chain-grate staked. Four Thompson-Houston turbine generators, two of 750 kv.a. and two of 1500 kv.a., supply cur-

rent at 440-v., 3-p., 50-cycle, three separate feeder lines to each department of the plant, and through transformers for quarry, pumping plant and village lighting. Surface condensers maintain 26-in. vacuum at this altitude of 2100 ft. Circulating water is sent through a spray system, as the plant is dependent upon catchment areas for its water supply. Good drinking and boiler water is secured at 15 miles distance in the mountains and pumped in through an 8-in. wood-stave pipe. Rainfall averages 24 in. per annum, but varies from 9 to 36, so careful consideration of supply was necessary.

Motors throughout the plant are of fairly high-speed, slip-ring type; larger sizes fitted with water resistance starters. All are ball and roller bearing and have given exceptionally good service with very little attention required. All heavy motors are geared to machines with enclosed helical gears with double flexible couplings.

A well-equipped engineer's office, machine shop, chemical laboratories, and electrical shop are maintained. Stores and costs systems are well developed along the best American lines.

Cement reached a top mill price of \$3.84, package included, under government control, and this is the current price. Labor is paid about the same as in the United

Form No. S.S. 32.

[COPY.]

DEPARTMENT OF PUBLIC WORKS, NEW SOUTH WALES.

No. 5636

CEMENT TEST CERTIFICATE.

Mr. F. Oaxden of **Kandos Cement Co. Ltd.** having applied to the Department of Public Works for a test of 3000 bags of **KANDOS** brand of Portland Cement, freshly manufactured by **N.S.W. CEMENT, LIME & COAL CO. LTD.** at "Store 1A (Insp. No. 2804)" which were stored at **Kandos**. Samples were on the 8th August 1922. selected by **Mr. Roberts** a Departmental Officer, and tested with results as follows:—

Reference No.	Description of Tests.	Standards required.	Results of Tests.	Details of Setting.			Method of Conducting Test.	
				Set Hard.				
1	FINENESS { Residue on a sieve of 14,400 meshes per square in. " " 32,400 " " }	Maximum, 13 per cent. " 25 " "	7.0 14.0	hrs. min.	hrs. min.	hrs. min.	4. Solution 20 per cent.	
2	SPECIFIC GRAVITY	Minimum, 3.000	3.12	5.0	16	5.30	5. Estimated with needle .039" diameter, loaded with 104 oz., bearing on a disc of neat cement 40 Mm. thick	
3	SULPHURIC ANHYDRIDE	Maximum, 2 per cent.	1.54	3	6.0	17	5.0	Gauged for one minute with 50 turns of mixing machine
4	RESIDUE INSOLUBLE IN HYDROCHLORIC ACID	" 2 " "	0.58	4	5.30	18	6.0	6. Temperature of water in cold bath, 65° to 75° Fahr. in hot bath, 175° to 200° Fahr.
5	TIME OF SETTING— At a temperature of 69° Fabr. (commencement) With 22.5 per cent of water (set hard) Consistency=20	Minimum, 1 hour Minimum, 3 hours, max. 12 hours	2 hours 15 minutes 5 .. 30 19	5	5.30	19	6.0	The briquettes are made with the Bohme hammer machine; the time occupied in completing the briquettes being limited to ten minutes.
6	TENSILE STRENGTH— Neat cement with 15.0 per cent. of water. After 1 day in air and 6 days in cold water of from 65° to 75° Fabr. After 1 day in air and 6 days in Deval's Hot Bath of from 175° to 200° Fabr. Cement 1 part, Sand 3 parts, with 7.7 per cent of water. After 1 day in air and 6 days in cold water After 1 day in air and 6 days in Deval's Hot Bath After 1 day in air and 27 days in cold water	Minimum, 585 lb. per sq. inch. " 715 lb. " " " 165 lb. " 250 lb. " 250 lb.	1253 lb. per sq. in. 1332 " " 430 " " 417 " " 512 " "	10	5.30	20	6.30	The Michaelis shot machine is used for breaking the briquettes. The speed with which the weight is applied is at the rate of 100 lb. in 12 seconds.
				11	5.0	21	6.0	The percentage of water used is based on the amount absorbed by the neat cement under a pressure of 2,000 lb. per square inch.
				9	5.30	22	6.0	The standard sand used is Nepean River sand, washed, dried and sifted through a sieve of 400 meshes per sq. in., and caught on a sieve of 900 meshes per sq. in.
				12	5.30	26	6.0	8. As measured by Dauschinger's Standard Expansion Apparatus.
				13	5.30	27	6.30	
				14	5.30	28	5.30	
7	COMPRESSIVE STRENGTH— Cement 1 part, Sand 3 parts, with 7.9 per cent. of water. After 1 day in air and 27 days in cold water After 1 day in air, 6 days in water, and 21 days in air	" 2,250 lb. " 3,570 lb.	5470 5777					
8	EXPANSION OF NEAT CEMENT— After 6 days in Hot Bath	Maximum, 0.10 per cent.	0.07					
9	SOUNDNESS— After 7 days in cold water; after 7 days in air; after 1 day in air, and 1 day in Deval's Hot Bath.	To show no sign of cracking, crumbling, or alteration of form.	Constant					

DECISION OF DEPARTMENTAL REFERENCE BOARD.

Approved by the Board, F.W. Dept.

8. 9. 22

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Approved by the Board, F.W. Dept.

8. 9. 22

These Standards were adopted by the Board of Reference on 2nd December, 1910.

Signed A. Morrison

Asst Supt. of Testing and Inspection.

Certificate showing that the cement complies with British government requirements

States, but capital charges are much higher owing to freight, duty and isolation.

Mr. Oakden's one-kiln plan with a possible three-kiln extension was so well laid out that the writer has been able to complete the four-kiln plant and extend the plan to provide for 12 kilns without material alteration.

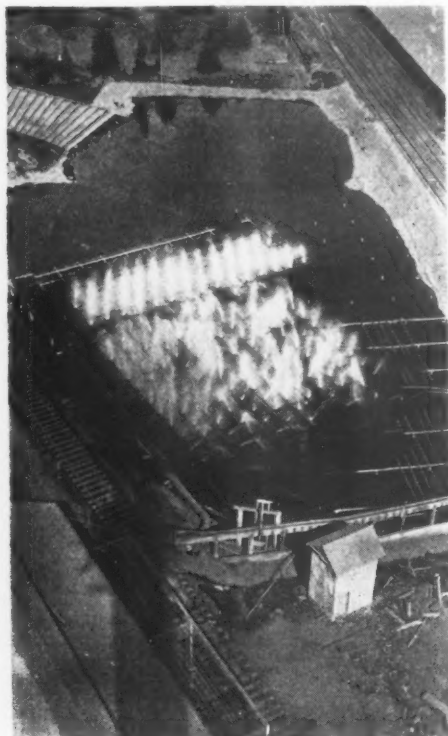
The Kandos Co. has been able to pay

Sand and Gravel Excavation by Hydraulic Dredge

Possibilities and Limitations of This Method Discussed from a Theoretical Standpoint and Compared with Other Methods

By Jean M. Allen

Consulting Engineer and Dredge Designer, Chicago



Spray system in cooling pond

consistent dividends since starting up and to carry out a continual development policy. Starting the second unit in 1916, the first was secured from internment in Portugal in 1918 and put into service. No. 3 unit was secured following a trip through the States by the writer in 1920, and No. 4 unit was started this year; further, the company took over the management control of the Queensland Cement Co. turning it into a successful two-kiln plant and organized and built the West Australian Co.'s two-kiln plant at Perth.

Due to protective tariff, combined with the conditions existing during the war and since, the cement industry in Australia is now on a sound footing.

The writer, having completed the organization work and leaving a well-trained staff of local men, returned to the States recently in order that his family might have the benefit of American schools, motoring with his family east from Frisco, visiting plants en route.

[Rock products industries in the Antipodes are having a notable period of development. We shall shortly publish an interesting article on a New Zealand rock quarry in which a face 150 ft. high is worked.—Ed.]

IN excavating raw sand and gravel, and conveying it to the screening plant to be washed and graded, one of the three following methods is usually employed:

1. The slack line cableway excavator, delivering direct to screening plant.

2. Steam shovels or dragline excavators, loading dump cars to be hauled to the screening plant.

3. Pumping by means of a hydraulic dredging plant.

Under certain conditions the hydraulic dredge has many advantages, and these points should be given careful consideration in making a decision as to the type of plant to be installed. Before deciding to install a hydraulic dredge, the following conditions should be carefully investigated and considered:

Of course, the first requisite of this method is that there must be a plentiful supply of water available, and the deposit must be at least partially submerged.

The character of the deposit has a considerable influence on the type of plant to be employed.

Recent Improvements

Until recently it was considered essential that the material be of such nature that it could be readily picked up by the force of the water entering the suction nozzle, and also that the deposit contain no considerable proportion of cobbles or boulders too large to pass through the pump. In recent years, however, many producers operating hydraulic plants have been installing in connection with their dredges, some form of rotary cutter or agitator. This device has been thoroughly developed by years of use by river and harbor dredging contractors, and some types are ideally adapted to sand and gravel excavation.

By means of a properly designed and installed cutter, such refractory materials as compacted sand and gravel, cemented gravel, and even soft ledge rock, can be successfully excavated by a hydraulic dredge. A properly designed cutter will also automatically exclude all stones too large to pass through the pump.

Where the deposit contains too much clay, loam, or other undesirable material, the hydraulic method has certain advantages, as the pumping process is in itself

a washing process. The material is thoroughly disintegrated while passing through the pump, and much of the objectionable matter is carried off by the overflow water.

The hydraulic method may also, in some cases, eliminate the stripping of overburden, for if the depth of the overburden is not over 10 per cent of the depth of the deposit, it may be allowed to cave into the pit, pass through the pump, and be eliminated by the overflow water.

Capacity

The capacity desired from the plant has considerable bearing on the type of equipment to be installed. While, in general, it may be said that even very small outputs may be secured economically with the pumping plant if conditions are favorable, should a large capacity be desired, the hydraulic method should, by all means, be given the first consideration, and adopted if possible.

The following are conservative approximate outputs which may be expected from various sizes of dredging plants (It may be mentioned that the size of a hydraulic dredge is usually given as the size of the suction and discharge pipe through which the pump works):

6-in.....	30 cu. yd. per hr.
8-in.....	60 cu. yd. per hr.
10-in.....	90 cu. yd. per hr.
12-in.....	125 cu. yd. per hr.
15-in.....	210 cu. yd. per hr.
18-in.....	300 cu. yd. per hr.

The above capacities may be increased 50 per cent under favorable conditions. It must be remembered, however, that the quantities given are those which a pump is capable of handling if sufficient power is applied to maintain the proper velocity of water in the discharge pipe, and also if the material is properly introduced into the suction pipe in a steady, continuous flow, up to the maximum that the pump can handle and still not clog the discharge pipe. To accomplish the latter, it is necessary that the material be of a free flowing nature, or that a suitable cutter or agitator be used, and also that the dredge be skillfully operated.

In fact, the successful operation of a hydraulic dredging plant is to a large

measure dependent upon the personal factor of the operatives.

The distance to which the excavated material must be transported to the screening plant has a definite influence on the type of excavating equipment to be employed, and this problem is closely related to the question of power cost in the locality of operation.

Theoretically, the hydraulic method is very extravagant of power, as about 85 to 90 per cent of water has to be pumped to transport 10 to 15 per cent of sand. However, the many advantages tend to outweigh this objection, and it is generally conceded that the hydraulic process is the cheapest known method of excavating and transporting large quantities of earth to a considerable distance. But, to pump heavy sand and gravel requires a much higher water velocity in the pipe line, and consequently, a much larger power expenditure than to pump clay and loam. Therefore, there is a definite limit, beyond which distance it is uneconomical to pump material, and where the steam shovel and dump car method had better be used. This limit will vary with each set of conditions, depending on the cost of the power available; the diameter of the pipe line; the total height to which the material must be pumped; and the character of the material, which determines the pipe line velocity. All of these factors, except power cost, are included in the item of total hydraulic head against which the pump must work. As the friction head is inversely proportional to the square of the diameter of the pipe, it follows that it is feasible to use longer lines with large diameter pipes than smaller ones.

170 ft. the Limit

It is not generally considered advisable to operate a dredging pump against a total head of more than 170 ft. Even this head means that the pump must be run at a very high speed, consequently the wear and maintenance will be very great. Where it is desired to work against a higher head it is feasible to install a second pump in the line to act as a booster, and this is often done with very satisfactory results. Theoretically, there is a no limit to the number of booster pumps that can be used, nor to the length of the discharge line, but in practice, every additional unit introduced into the line increases the probability of delay due to breakdown of any one unit, so it is seldom advisable to use more than two boosters, and the wisdom of more than one is doubtful, as at this point it would probably be cheaper to use a steam shovel and dump cars.

The question of head brings up the problem of whether to pump directly into the screens or whether to deliver into a dewatering sump, and then raise the solids to the screens by means of a dredging elevator.

Pumping Directly to Screens

Where power is cheap, and the elevation of the screens is not too high, it may be advisable to pump directly into the screens. In plants of large capacity with high storage bins and thus high screens, and where the initial cost of the plant is not of prime importance, the method of pumping to a sump is undoubtedly the better practice, and results in a considerable saving of power. This reduction of the height of discharge also increases the effective radius of pumping without the aid of a booster.

In this article no attempt has been made to define the economical limits of any particular type of pumping plant, nor to offer a solution to any concrete problem, but merely to indicate the various factors that must be considered in connection with an installation of this character. In order to secure a successful, economical, and well balanced plant, a careful study must be made of all the conditions and elements, both engineering and financial, entering into the problem.

Batesville White Lime Co. to Make Chemical Lime at Ruddels, Ark.

THE Batesville White Lime Co., which was formerly known as the Arkansas Lime Co., is building a new plant near Bethesda, Ark., which is to manufacture building and chemical lime and hydrate. As soon as it is operating, the plant at Ruddels, Ark., will be used entirely to produce chemical lime, and will serve the growing pulp and paper industry in the South. It will be equipped with a three kiln fireproof modern calcining plant and a hydrating plant with a capacity of five tons an hour. It will be located on the Cushman branch of the White River division of the Missouri Pacific, and a narrow gage industrial railroad will be built from that place to the quarry, a distance of two miles.

The stone from which the lime will be made is Boone lime, and it burns into a product as white as snow. An average analysis of 99.34 calcium oxide is claimed. It is of such a high quality that it will enable the concern to reach territory in 25 states.

A Billion Dollars' More Concrete Laid in 1923

THE increase in the use of concrete goes on. Last year the portland cement production probably totaled 135,000,000 bbl. as compared with the record of 115,000,000 the year before. This is pretty close to 100,000,000 cu. yd. of concrete, which by conservative estimate cost a billion dollars to place. Here is a major industry, but one singularly diverse and lacking unity of purpose or direction. Leaving aside say one-third of the concrete as being placed by

farmers and house owners in minor use, there still remains more than two-thirds of a billion dollars placed last year in permanent structures by many individuals and by many methods. Considering the diversity of manufacture the quality of the product is remarkably high, but it is by no means as high as it should be. The outstanding feature of the concrete art in the past few years has been the growing appreciation of the need for education in the art of making concrete. Gradually the gospel of better concrete is overcoming the self-satisfaction of its makers. The many and scattered series of tests are beginning to take on more than academic importance and their application to actual structures, both in the process of making and in the process of use, is beginning to take form.—*Engineering News-Record*.

Superior Cement Co. Pays 100th Dividend

THE Superior Portland Cement Co. was organized in 1907 by John C. Eden, E. E. Caine, Geo. W. Dickinson, W. D. Honfius and other Seattle, Wash., men to purchase a large deposit of cement material and construct a cement plant at Concrete, Wash. The company has been in continuous operation and has grown to one of the largest industrial enterprises in the Northwest.

In 1918 the company purchased the Washington Portland Cement Co. and consolidated the two companies, for which it issued \$1,250,000 worth of 6 per cent bonds, the full amount of which was to be retired by 1935. These bonds have been called up to and including 1930, leaving a balance still outstanding of \$350,000.

The company has just paid its 100th consecutive dividend at the rate of 6 per cent per annum and also paid several extra dividends during the period. There are several hundred shareholders, practically all of whom are residents of Seattle or nearby towns and cities.

Present officers of the company are John G. Eden, Jas. R. Starret, S. L. Barnes and A. A. Sutherland—Seattle, Wash., *Journal of Commerce*.

Feldspar Deposits Giving Out

SPEAKING of feldspar at a ceramic convention in New Jersey, Prof. J. B. Shaw said the time would come when much more inferior deposits would have to be worked than now. Pennsylvania had once been an important source of feldspar supply, but was no more so. The New England supply was on the decline. Inferior deposits had been left standing because of their too great contents of soda and even lime. "It is the ceramic engineer's duty," said Prof. Shaw, "to study the requirements of the ceramic body to enable manufacturers to use feldspar that contains 3 to 40 per cent lime. I don't know how to do it, but I know it can be done."

Energizing the Slate Industry

Third Annual Industry Conference Shows Satisfactory Progress Being Made and a Promising Future Opening Up for the Slate Producers

THE National Slate Association held its Third Annual Industry Conference at the Hotel Commodore, New York City, January 21, 23, inclusive. This meeting was given over entirely to the discussion of the problems of the slate producers. The election of officers will be held at the regular business meeting next April.

Without question this meeting stimulated more enthusiasm among the slate people and more interest among allied groups than any previous convention. Not only did many producers attend but also contractors, architects, government representatives and other important groups.

It is much more satisfactory to discuss problems when the opposing side is present, for by asking questions and getting immediate answers considerable progress can be made. So it was with the slate people; on the question of standardization, for instance: architects, master plumbers and dealers joined in open discussion with the producers. As a result, some of the reasons why slate sales find so much resistance were definitely established.

It was the idea of the convention manager, W. S. Hays, to hold group discussions and then open forum. The program was arranged with this in mind.

Labor

Perhaps the most important problem the producers must solve is that of labor. Not only do they need skilled and unskilled labor now but when their sales increase they will be all the more handicapped. The convention was fortunate in having E. J. Henning of the Department of Labor address them on the question of securing labor from abroad. Contrasted with the present shortage of labor in the plants here is the situation in England, where there are many efficient slate workers out of employment. If in some way some of the shortage here could be relieved by importing labor from abroad, then the problem of securing full working forces might be solved.

Mr. Henning informed them just where they stood in respect to the labor law and advised them to first incorporate and then file with the Department of Labor a request for permission to bring into the country a definite number of workmen skilled at a specific trade. This is permissible under the law providing certain restrictions regarding the contract labor law and the immigration law are honored.

After a vote to incorporate, the committee on recruiting of labor was requested to

take the matter up with the government authorities.

As there is a present shortage of about 500 men, more immediate results were desired, so the question of stimulating interest among the home-town boys and men were discussed. W. H. Smith of Bangor, Pa., told of the success he had with his apprentice school last summer (see *Rock Products* August 11, 1923). Of the six boys who attended, two are now with him definitely established in the trade as "slaters" with an efficiency almost equal to the average veteran.

Mr. Smith estimates his direct cost at \$500 for each of the two boys who stayed but balances against that a saving of time, as in the old days it took six years, as against about six months in this case, to train a "slater."

It seems that no one has tried to duplicate Mr. Smith's action, but since he was so successful perhaps others will try it. It was urged that the industry back up this idea wholeheartedly, as it offers a partial solution to its labor problem. It is apparent that some concerted action must be taken, otherwise the industry will have to face a dearth of skilled slaters, some producers putting the day at only 10 years off. Probably the solution will be found in a combination of three ways: training of boys, importation of skilled labor and inducing men in other trades to take up slate making. It will require time, money and patience to secure the desired results, but it can be done.

During the discussion on labor, Dr. Bowles of the Bureau of Mines urged that the producers use labor saving machinery not only from a direct economic point of view but from the humanitarian side as well. The Auld & Conger plant at South Poultney, Vt., was pointed out as an excellent example to follow; for instance, the slaters stack their slates in racks which are wheeled away and the waste is dropped into hoppers from which it is regularly removed by unskilled workers. The main point being, that "the slater is kept busy making slates."

Improved Production Methods

Correlative to the labor discussions are the ideas regarding the various methods for improving production.

The question of wire cutting instead of channeling came up. Only one machine has been seen in operation in this country and results were not satisfactory, not due to any defect in the machine but to the perversity of human nature. At first, steel cuttings were dropped in the channel and when that

did not work the operator was dropped over the dump. Operations with that particular machine were called off. A wire cutting machine was tried in Vermont marble quarries with but little success, which contrasts with the results obtained in Italy at the Carrara marble quarries.

On the question of diamond and carborundum saws, it was claimed that the former worked well enough while the diamonds remained set, but that the slate seemed to wear the metal setting and soon the gems were lost.

Planers and rubbers were on the whole considered satisfactory, although further research along the lines of simplification and one continuous machine was recommended.

Craftmanship

The slate men recognize that they are turning out something besides mere slate. In many cases it is a work of art and as such is entitled to receive careful attention during the process of manufacture.

But this attention should not cease as soon as the slate leaves the plant. For his own good each producer should see that his product receives careful attention until it is in place. This policy is forced on the slate men, as they ultimately receive all complaints. If such complaints are not satisfactorily adjusted, the industry as a whole receives a setback.

Prominent slate men urged the producers to watch the quality of slate and the workmanship carefully and insist that they be kept up to standard.

Traffic

On this important question, not much activity materialized, due to a train wreck, which prevented the association's traffic manager, Mr. Brown, from being present.

This bureau of the association is not utilized as it might be. As an industry the slate men can secure many advantages by co-operating with the traffic manager, where if they act independently such advantages are hard to obtain.

Many thousands of dollars are now lost through poor crating. This important phase of the slate problem will undoubtedly be solved and the report placed at the disposal of the members.

Board of Arbitration

Many times have the producers, dealers and contractors had disputes which threatened to develop into court action. The members and other interests present went on record as favoring a definite line of pro-

cedure in case of dispute; namely, if the disputants cannot settle, the secretary of the association is called in; if this does not obtain satisfactory results then the board of arbitration acts. At present this board consists of the directors of the association.

By adopting this line of procedure, it was felt that the association would be materially strengthened, for one of the problems has been to get the members to solve their problems as an industry's problem.

New Uses of Slate

The Ruberoid Co., manufacturers of slate veneer roofing, sent a representative to discuss with the slate people the new shingle they are putting on the market. This company states that it is not entering into competition with the slate producers but is intending to occupy a middle ground between slate roofing and prepared roofing. Their plans of distribution call for no conflict, as they will market through the channels they now use on other products. In fact, instead of hurting the slate industry, they feel that they will help it, as they expect to use a large tonnage of slate for veneering.

An interesting and instructive discourse on the electrical slate market was given by Robert Nodvest of Cleveland. Drawing on his fund of experience in this particular line, he gave the electrical slate producers many new facts for them to consider and offered every co-operation in helping to increase the uses of slate for electrical purposes. He has conducted many experiments and claims nothing can equal slate as switchboard material. Marble, its nearest competitor, has favorable dialectic properties but falls down on physical requirements.

While dwelling upon the virtues of slate, Mr. Nodvest did not hesitate to tell the slate producers that they must make their own market and insist upon accurate workmanship and satisfactory dialectic properties. Only by taking a firm stand in this matter can they regain the market once enjoyed and to which they are entitled. As a warning, he mentioned how one of the largest manufacturers of electrical equipment has within a month changed its specification from slate to a competitive material.

Simplification

During the discussion of simplification the meeting was in charge of R. N. Hudson of the Department of Commerce.

Under the direction of Secretary Hoover much valuable work has been done toward simplifying practices and standards in other industries such as lumber, tile prepared roofing, etc.

The crying need of the slate industry is to limit the number of sizes and styles and to establish definite standards upon which the consuming public can base its specifications.

While it is desirable to limit the sizes and styles, it was pointed out by the slate men that due to the large and unavoidable waste in quarrying and milling it is always

necessary to secure as large a piece as possible from the slab. Because of this more latitude was desired than suggested by outside interests.

As this subject brought out so many conflicting interests and is of so much importance, it was referred to a committee for further study. This committee is to include representatives of the government, contractors, architects and dealers, as well as representative slate men.

Advertising and Selling

In the field of advertising and selling, the slate producers have serious competition. Not only must they sell an article which is in many cases higher priced, but they must overcome the handicap of a too conservative policy in vogue for many years. Consistent and forceful advertising is necessary.

To divert money from luxuries to better homes and to educate the people to the necessity of better schools is a legitimate object and one well worthy of co-operative effort.

Apparently the dealers' advertising has not been satisfactory, from the producers standpoint. Too many times has the dealer specified in his advertisement that he is desirous of selling and can deliver competitive goods. Until dealers are given sufficient inducements to confine their activities solely to slate, it cannot be expected that they will refrain from advertising competitive materials. This problem must be solved, as competitive goods are undoubtedly eating into the profits which might go to the producers of slate.

However, the association has for a year or more conducted a constantly growing advertising campaign. That it is proving successful seems evident when the gross sales for three years back are considered. Not only has the value increased but the tonnage as well.

1921	1922	1923
\$7,322,006	\$9,176,784	\$12,085,000 (est.)

This is satisfactory and indicates that the industry is on the right track and will undoubtedly continue to improve for some time to come.

As to selling, emphasis was made of the "personal touch." Slate producers or their representatives must personally "sell" the specifier of materials as well as the ultimate consumer. It can be seen that the former might turn down slate as a basis of cost rather than inquire into its superior merits and in many cases the latter has an erroneous idea as to the cost being excessive.

Unquestionably the slate producer is responsible until the slate is "in place" and giving satisfaction. Too often has the slate been shipped—perfectly good slate—only to have the installation spoiled by poor workmanship. As a result the industry suffered and the producers cannot afford to neglect this any longer. Perhaps it is not fair to ask them to look after their interests through so many steps, yet it is an evil that is forced on them.

Mr. Wooley, a plumber from Evansville, Ind., and manager of the National Trade

Extension Bureau, very frankly told the slate men why the trade did not co-operate. Such items as non-standardization, poor deliveries, quality not up to specifications, inaccuracy of measurements and apparent lack of interest in the final installation of the slate tended to drive the contractors to competitive lines.

Another phase of the selling problem is the lack of skilled roofers. Today there is a serious shortage of these mechanics, so much so that it is estimated that five times the number now at work could find steady and profitable employment. Two opposing ideas were discussed: one that young men in small towns should be taught the trade at a school established by the slate people and the other that young men should be placed under "card" journeymen and taught through practical experience. Probably a combination of these plans will work out a solution. It is a vital problem though, as it will be of no avail to increase the consumer demand for roofing slate and then have no one to lay the roofs satisfactorily.

Jobbers

This allied group presented a resolution asking for a definite meaning of the word "dealer," and expressed an opinion that those who dealt in slate only should receive a preferred classification.

The question of storage is a problem for these people. Because of the large assortment of styles and sizes, they thought some action should be taken by the producers toward establishing storage yards. Possibly the settlement of the "standardization" problem will automatically settle this one.

Entertainment

The Pathascope Co. exhibited a one reel picture of scenes taken in and about slate quarries. This will be kept as a nucleus for a series giving the entire story of slate. The members feel that with such films available they will be better prepared to convince consumers that slate is the proper material to use.

At the banquet Monday night, the speaker was Mr. J. W. Raper, editor of the *Cleveland Press*. His remarks combined satire, humor and serious thought. After a rather strenuous day of discussing problems, it was a relief to sit down to an excellent dinner and then listen to Irvin Cobb's prototype.

A rather unique feature was the Tuesday lunch when many manufacturers who sell equipment in the slate field acted as hosts to the slate producers. Practically every firm was represented and each in turn made remarks appropriate to the occasion. The toastmaster was C. S. Jackson of the Quarry Supply Co., Penn Argyl, Pa.

The final luncheon was held Wednesday at which a few minutes were given to eulogizing Mr. Keenan and Mr. Davis, two prominent slate men who recently passed away. These men were of the progressive type and had the welfare of the industry at heart. It is the aim of every member to carry on

the work in which these men were so interested and to put the slate industry back on its feet.

1924 Slate Industry Conference Attendance Company Representatives

F. H. Abel, Auld & Conger Co., Cleveland, O.; Frank E. Allen, Fair Haven Marble and Marbleized Slate Co., Fair Haven, Vt.; Fred W. Allen, John D. Emack Co., Middle Granville, N. Y.

C. W. Barker, F. C. Sheldon Slate Co., Granville, N. Y.; G. F. Barnard, Munson-Maine Slate Co., 112 Water St., Boston, Mass.; E. R. Blaisdell, Structural Slate Co. and Natural Slate Blackboard Co., Old South Bldg., Boston, Mass.; Wm. Blake, Columbia Bangor Slate Co., Bangor, Pa.; James H. Burdett, Jr., Evergreen Slate Co., Inc., Granville, N. Y.

R. D. Chapman and Henry Chapman, Chapman Slate Co., Bethlehem, Pa.; Mrs. E. C. Costello, Davis Slate & Mfg. Co., Chicago, Ill.

W. S. Ditchett, Columbia Bangor Slate Co., Bangor, Pa.; W. L. Doney, Diamond Slate Co., Pen Argyl, Pa.

James H. Emack and H. D. Emack, John D. Emack Co., Philadelphia, Pa.

Mr. Fritz, Chapman Standard Slate Co., Philadelphia, Pa.

Richard Griffiths, Penrhyn Slate Co., Hydeville, Vt.

J. Hamm, Jr., Bangor Fidelity Slate Co., Bangor, Pa.; W. L. Hassenplug, Rising & Nelson Slate Co., 112 S. 16th St., Philadelphia, Pa.; H. D. Hicks, Evergreen Slate Co., Inc., Granville, N. Y.; J. N. Hoffman and R. C. Hoffman, Structural Slate Co. and Natural Slate Blackboard Co., 620 Bond Bldg., Washington, D. C.; B. T. Hutchison, Parsons Mfg. Co., Pen Argyl, Pa.

John S. Jackson and W. Jackson, Jackson Bangor Slate Co., Pen Argyl, Pa.; C. H. Jacobs, Chapman Standard Slate Co., Philadelphia, Pa.

P. W. Keenan, Keenan Structural Slate Co., Bangor, Pa.; Oliver F. Kern, Highland Slate Co., Slatedale, Pa.; Wm. A. Kitto, Structural Slate Co. and Natural Slate Blackboard Co., Pen Argyl, Pa.; Chris H. Koch, Structural Slate Co. and Natural Slate Blackboard Co., 200 Fifth Ave., New York City.

W. A. LeSueur, LeSueur Slate Co., Ore Bank, Va.; R. B. Lewis, Phoenix Slate Co., Wind Gap, Pa.; C. A. Lowry, Auld & Conger Co., Cleveland, Ohio; Leigh Lundy, Rising & Nelson Slate Co., 101 Park Ave., New York City.

N. M. Male, Jackson Bangor Slate Co., 225 Amber St., Pittsburgh, Pa.; C. W. Masters, Structural Slate Co. and Natural Slate Blackboard Co., 313 Perry Bldg., Philadelphia, Pa.; H. H. Mathews, Old English Slate Quarries, 10 Milk St., Boston, Mass.; Walter McQuade, Rising & Nelson Slate Co., West Pawlet, Vt.; Herman A. Miller, Diamond Slate Co., Pen Argyl, Pa.; A. H. Morrow, Rising & Nelson Slate Co., West Pawlet, Vt.

R. H. Neilson, Blue Ridge Slate Co., Esmond, Va.; E. R. Norton, Norton Bros., Granville, N. Y.

Jas. O'Halloran, Jackson Bangor Slate Co., 225 Amber St., Pittsburgh, Pa.; James Owens, Blue Mountain Slate Mfg. Co., Slatington, Pa.; Robt. Owens, Owen W. Owens Sons Co. and Progressive Slate Co., Granville, N. Y.

H. Lucas Parsons, Parsons Bros. Slate Co., Pen Argyl, Pa.; W. H. Pelkey, W. H. Pelkey & Sons, Fair Haven, Vt.; Geo. B. Plush, Structural Slate Co. and Natural Slate Blackboard Co., Buffalo, N. Y.; James R. Pugh, John D. Emack Co., 17 E. 49th St., New York City; O. B. Pyle, Jr., Munson-Maine Slate Co., 112 Water St., Boston, Mass.

R. W. Radcliffe, Colonial Slate Co., Bangor, Pa.; F. B. Richards, Old English Slate Quarries, Glens Falls, N. Y.; Mr. Roberts, Norton Bros., Granville, N. Y.

R. S. Saeger, Bangor Quarry Co., Bangor, Pa.; F. C. Sheldon, F. C. Sheldon Slate Co., Granville, N. Y.; G. H. Shinville, Fair Haven Marble and Marbleized Slate Co., Fair Haven, Vt.; Wm. H. Smith, North Bangor Slate Co., Bangor, Pa.; B. O. Solt, Chapman Slate Co., Bethlehem, Pa.; Sidney Spry, Colonial Slate Co., Bangor, Pa.; P. C. Stanwood, Blue Ridge Slate Co., 723 Transportation Bldg., Washington, D. C.

W. A. Thomas, Keenan Structural Slate Co., Bangor, Pa.

Richard S. Whitesell, Theo. Whitesell Co., Easton, Pa.; Wm. Wright, Davis Slate & Mfg. Co., Chicago, Ill.

Geo. A. Young, A. B. Young Co., Fair Haven, Vt.

Slate Jobbers and Dealers

E. A. Bullard, 746 Tremont Bldg., Boston, Mass.

J. H. Earnshaw, Columbus Slate Co., Columbus, Ohio.

L. E. Field, 209 W. 48th St., New York City; J. Friedman, Federal Seating Co., 132 W. 43rd St., New York City.

S. H. Hamm, S. H. Hamm & Son, Bangor, Pa.

A. E. Jacobs, Jacobs Thompson Co., Inc., Pittsburgh, Pa.; E. J. Johnson, Knickerbocker Slate Corp., 153 E. 38th St., New York City.

V. E. Lake, Slate Veneer & Perf. Slate Co., 452 Lexington Ave., New York City.

Lester H. Orr, Knickerbocker Slate Corp., 153 E. 38th St., New York City.

B. W. Ribble, B. W. Ribble Co., Bangor, Pa.; J. G. Robinson, 6202 Germantown Ave., Philadelphia, Pa.

P. N. Snyder, Slatington Bangor Slate Syndicate, Slatington, Pa.; C. F. Sudbrack, Ohio Valley Slate Co., 807 Gerke Bldg., Cincinnati, Ohio.

Hugh A. Thompson, Jacobs Thompson Co., Inc., Pittsburgh, Pa.

D. W. Widmayer, Mattison Trading Co., Ambler, Pa.; Jas. L. Williams, 1548 S. Vandeventer St., St. Louis, Mo.

Slate Setting Contractors and Local Mills

G. G. Albert, G. G. Albert & Co., Bangor, Pa.

A. E. Brown, 30 Dixon Ave., Binghamton, N. Y.

Fred A. Doolittle, F. A. Doolittle Tile Co., Bridgeport, Conn.

Alexander Geller, Daniel M. Rader, New York City.

E. P. Henry, E. P. Henry Co., 2121 Vine St., Philadelphia, Pa.

Sam Plotnick, Hecla Slate Co., 805 E. Sixth St., New York City; Albert F. Premo, W. J. Kelly Co., Springfield, Mass.

P. L. Steuber, Slatecraft Studios, Old South Bldg., Boston, Mass.

Earl B. Warner, E. B. Warner, Inc., 27 Crown St., New Haven, Conn.

Slate Roofing Contractors

Nicholas F. Adams, Wyndmoor, Pa.

Mr. Brown, Craig & Brown, 421 20th St., Brooklyn, N. Y.

A. W. Carmichael, A. W. Carmichael, Ltd., 918 Palmerstone Ave., Toronto, Can.

S. A. Dalzell, Dalzell Bros. Co., Youngstown, Ohio; H. A. Daniel, Atlas Roofing Co., Newburg, N. Y.; Mr. Downey, Richard Hanley, 144 Central St., Worcester, Mass.

J. Henry Fell, Henry R. Fell Co., Trenton, N. J.; Jno. C. Finnegan, 462 E. First St., S. Boston, Mass.

Wm. Garthe, Wm. Garthe Co., 2318 Oak St., Baltimore, Md.; Wm. Green, Wm. Green & Sons, 613 Broad St., Utica, N. Y.; L. M. Gunderson, 1877 Sheldon Ave., Cleveland, Ohio.

J. Hermonovich, Crofton Roofing and Furnace Co., Crofton, Pittsburgh, Pa.; E. R. Huddy, E. R. Huddy & Co., Trenton, N. J.; David Humphreys, M. R. Humphreys & Co., Indianapolis, Ind.

Jos. V. Kelley, 40th & Lancaster Ave., Philadelphia, Pa.

Edw. P. Leavitt, W. P. Leavitt Sons Co., 153 Pearl St., Newton, Mass.

Robert McClorhy, 390 Elizabeth Ave., Newark, N. J.; G. R. McNulty, G. R. McNulty Co., Huntington, L. I., N. Y.; E. E. Miller, Kansas City Slate & Tile Rfg. Co., Kansas City, Mo.

S. H. Spiegle, Hecla Slate Co., 805 E. Sixth St., New York City.

H. L. Williams, Williams Bros. Co., 9909 Gaylord Ave., Cleveland, Ohio.

Guests

Herbert Abraham, Ruberoid Co., 85 Madison Ave., New York City.

Oliver Bowles, Bureau of Mines, Experiment Station, New Brunswick, N. J.; D. Knickerbocker Boyd, Structural Service Bureau, 112 S. 16th St., Philadelphia, Pa.

Mr. Chester, National Association Master Plumbers.

E. W. Ely, Division Simplified Practice, U. S. Dept. of Commerce, Washington, D. C.; Albert E. Enoch, Lehigh & New England R. R., Bethlehem, Pa.

A. Lynwood Ferguson, Structural Service Bureau, 112 S. 16th St., Philadelphia, Pa.; T. Foster, Chief Furn. Div. Board of Education, 570 W. 183rd St., New York City; Mr. Frayne, Dept. of Labor, Washington, D. C.

Frank S. Hanley, Eastern Supply Association, New York City; W. S. Hays, Secretary, National Slate Association, Philadelphia, Pa.; E. J. Henning, Asst. Secretary of Labor, U. S. Dept. of Labor, Washington, D. C.; R. N. Hudson, Division Simplified Practice, U. S. Dept. of Commerce, Washington, D. C.; Geo. K. Hyslop, Smart, Gore & Co., 42 Broadway, New York City.

Clinton F. Irvin, Pathscope Co. of America, Inc., Aeolian Hall, New York.

C. Haldane Johnson, Advertising Counsellor Association.

Jas. L. Kelly, International S. T. & C. R. D. & W. W. A., 1235 Monterey St., Pittsburgh, Pa.; C. Tyler Kelsey, Griffin, Johnson & Mann, Inc., New York City; F. W. Kennedy, Cement Mill and Quarry, 15 Park Row, New York City; LeRoy Kern, American Institute of Architects, New York City; D. W. Kessler, U. S. Bureau of Standards, Washington, D. C.

G. F. Loughlin, U. S. Geological Survey, Washington, D. C.

Conklin Mann, Advertising Counsellor Association; W. J. Marshall, Merchant Plumber and Fitter, 200 Fifth Ave., New York City; Mr. Murphy, National Association Master Plumbers.

Robt. Notvest, Research Engineer, 513 National Bldg., Cleveland, Ohio.

John W. Raper, Editor, Cleveland Press, Cleveland, Ohio; G. R. Roberts, Supervising Architects Office, U. S. Treasury Dept., Washington, D. C.

Alan B. Sanger, Rock Products, New York City; John G. Scott, Supt. Buildings, Building Officials Conference, East Orange, N. J.; Robert H. Spare, I. Franklin Howard & Co., 304 Perry Bldg., Philadelphia, Pa.; C. B. Springer, General Electric Co., Schenectady, N. Y.

T. W. Vinson, Secretary, National School Supply Association, Chicago, Ill.

C. L. Warwick, American Society for Testing Materials, 1315 Spruce St., Philadelphia, Pa.; Frederick A. White, Domestic Engineering, 110 E. 42nd St., New York City; Wm. J. Wooley, Manager, Nation Trade Extension Bureau, Evansville, Ind.

The Northwest Engineering Co. Opens Memphis Office

THE Northwest Engineering Co., 28 East Jackson boulevard, Chicago, Ill., has opened a Memphis office in the Central State Bank building, 127 Madison street, Memphis, Tenn.

M. B. Rider will be in charge of this office, which will sell crawler cranes, shovels, draglines and trench pull shovels by agencies in the states of Tennessee, Mississippi, Arkansas, Alabama, Louisiana and Texas.

Mr. Rider is a civil engineer and a graduate of New York university. He was assistant engineer on the New York City subway, junior engineer on the New York barge canal, designing and field engineer of the National Bridge Works and has had over 14 years of engineering experience. He is well acquainted with methods of material and industrial handling and fully qualified to give valuable advice in shovel and crane problems. He was connected for two years with the sales organization of the Bethlehem Steel Co. and for six years with the Lakewood Engineering Co.

Talc Producers to Unite

INDUSTRIAL and Engineering Chemistry has the following account of the consolidation of Vermont talc producers:

"For several years Vermont has led the states of the Union in the production of talc. The talc occurs in lenses running throughout the center of the state, from north to south, and is derived from serpentine. The companies engaged in talc mining and milling are: American Mineral Co., with mines and mill at Johnson; Magnesia Talc Co., with mines and mill at Moretown; Eastern Talc Co., with mines and mills at East Granville and at Rochester, and Vermont Talc Co., with mines in Windham county and mill at Chester Depot.

"Last July the Magnesia company acquired control of the American Mineral Co. Recently articles of incorporation have been drawn up for The Eastern Magnesian Talc Co., with capital stock of \$1,500,000, for the purpose of consolidating the three old companies. It is understood that Freeland Jewett, former president of the Eastern Talc Co., will be at the head of the new corporation, the headquarters of which will be at Burlington."

Burning Lime with Producer Gas from Brown Coal

German Experience with Fuels of 4000 B.t.u. and Less

By Hubert Hermanns
Consulting Engineer, Berlin, Germany

EDITOR'S NOTE

GOOD COAL has always been so cheap in this country that few American lime manufacturers have had to give much thought to fuel economies. Perhaps such a time is not yet come. Yet the use of local materials to the best advantage is always an economic advantage.

The only American gas-producer gas which is as low in B.t.u. per cubic foot as the German brown coal referred to in this article is North Carolina peat—109.7 B.t.u. There are very large deposits of peat in this country which possibly can be used for local lime burning.

THE heating of lime kilns with producer gas is by no means new. In many countries such kilns have been in operation a long time. In Germany extensive tests with such kilns had already been made in the sixties of the last century, which tests, however, not always gave favorable results; so that later on ordinary coal furnaces were more and more employed. Fig. 1 shows a gas lime kiln of this old construction. The gas producers, *a*, of the old Siemens type, combined in pairs, are situated directly at the kiln and can be put in communication with it by means of a damper, *b*, as desired. The gas produced enters an annular channel, *c*, and flows through tuyeres *d* into the shaft *e*.

The reason why the results proved unsatisfactory in some cases in which producer gas was employed was that the area of the shaft was made too large, so that the gases ascended along the walls of the shaft and did not reach the central part of the kiln. While thus the limestone at the walls was well burnt, the temperatures at the middle of the shaft were too low, so that only part of the limestone in the kiln was completely burnt. It was attempted to overcome this difficulty by constructing the kiln shaft oval in cross-section. The desired result was, however, only partly attained, because the shaft was made still too wide even at the narrowest part. These failures led to the abandonment of the

producer-gas heated kiln, as already mentioned.

In course of time further attempts were made to render the fundamental advantages of the producer gas available for lime kilns by reducing the area of the shaft and utilizing the sensible heat of the gases to the greatest possible extent. In this manner the semi-gas fired kiln, Fig. 2, was arrived at, which is very similar to the producer-gas type. In this kiln the gases

pass into the kiln shaft at a very high temperature and the vigorous motion of the hot gases causes a better distribution over the area of the kiln. However, in this kiln high grade coal with low contents of water and ashes must be burnt on the grate *a*. A further drawback of this kiln type is that the burnt limestone passes at a very high temperature into the portion of the kiln below the tuyeres *b*, whereby a considerable waste of heat and difficulties in

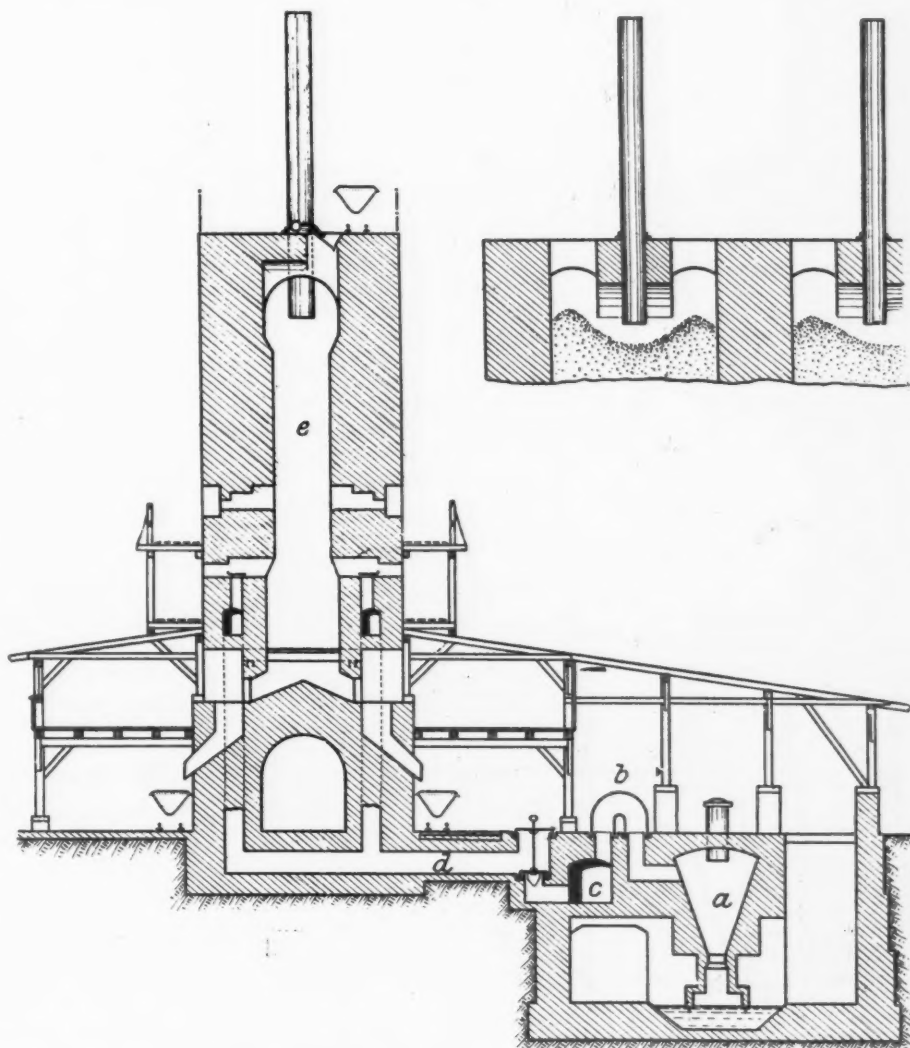


Fig. 4—Kiln with brown coal gas producer. The producer chamber *a* has no grate. The gas passes through the bend *b* and is cooled to drop the water vapor it carries before going into the gas flue *d*

tapping the burnt lime are caused. For these reasons these kilns have not been adopted to any considerable extent.

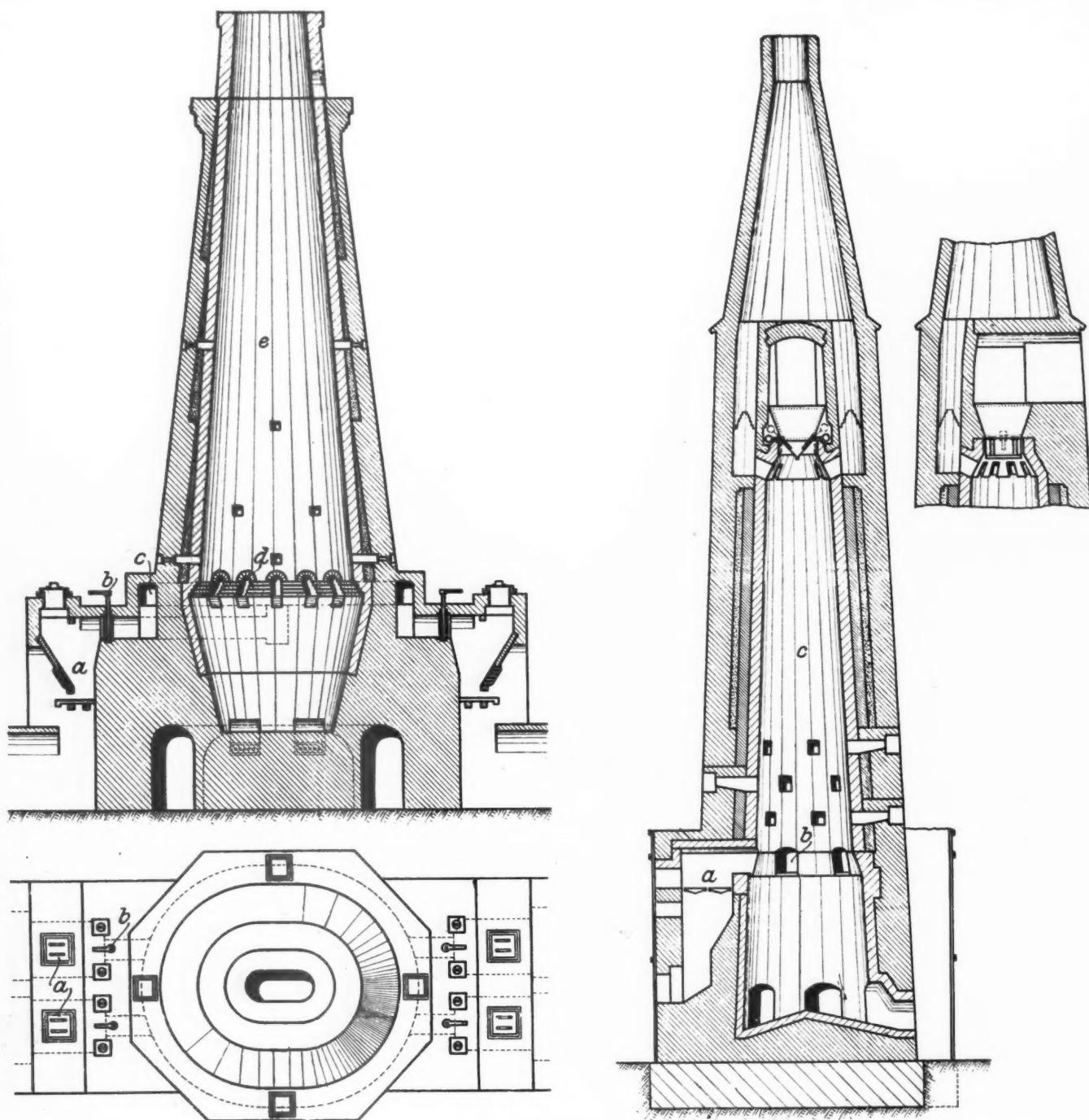
As compared with the construction shown in Fig. 2 the construction illustrated in Fig. 3, which in the manner of operation differs only slightly from the former, has the advantage that charging the producers from the top is considerably simpler. The gas producers *a* become gradually narrower towards the grate *b*. In order to obtain the best possible distribution of the gases in the shaft *d*, numerous tuyeres, *c*, are arranged upon the circumference. In this producer type it is also necessary to employ high grade fuel.

In these recent years the producer gas

kilns for burning lime have received a fresh impetus in Germany owing to the scarcity of high-grade fuel, pit coal and coke. As a large portion of the coal mines has been torn from Germany by the peace treaty of Versailles and the Geneva decision, pit coal and coke were almost entirely taken away from the lime works and brown coal was offered them instead. To explain this it must be pointed out, that in Germany all the coal produced is distributed by the government. The office appointed for this purpose, the "Reichskohlenrat," decides what quantities and qualities of coal are to be placed at the disposal of individual works. Brown coal occurs in Germany in ample quantities. The brown

coal is, however, not suitable to be burnt in lime kilns owing to its low thermal value, which is only 2200 calories per kilogram (3950 B.t.u. per lb.) and its high content of water, which amounts up to 60 per cent. Brown coal can only be employed for lime kilns if it is converted into gas.

In principle the gasification of the raw brown coal is easily carried out. The gas produced is, however, also of low grade. Its thermal value amounts to about 110 B.t.u. per cubic foot only and with such a gas a temperature of approximately 2200 deg. F. can only be produced, while the temperature required for burning limestone amounts to approximately 2800 deg. F. This low temperature development is mainly to



Left (Fig. 1): The first design of producer gas kiln; the shaft was too large so that the flame ran up the walls. Right (Fig. 2): An improved design which worked better but only high-grade bituminous coal could be burned on the grate of the producer, *a*

be accounted for by the steam or water contained in the gas and which must be withdrawn before burning the gas. As the proper temperature of the gas escaping from the producer is only a little above 200 deg. F., it is only necessary to cool the

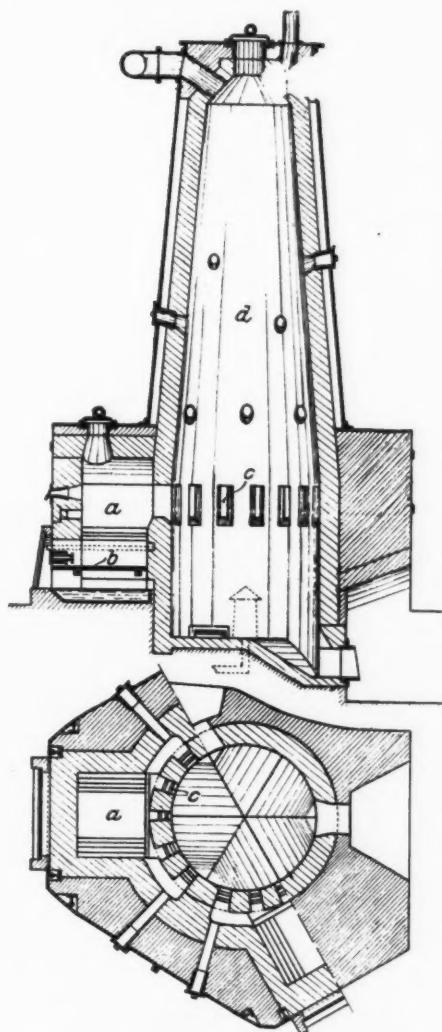


Fig. 3—A third improvement in the design of producer gas pits, the fuel space being hopped so that the producer might be more easily fired from the top

gas down to about 180 deg. F. in order to attain the condensation and precipitation of the steam vapors. This lowering of the temperature can easily be brought about by frequently deviating the gas from its path. It will be readily understood that under these circumstances it will be impossible to connect the gas producers directly with the kiln. It will be necessary to insert flues between the producers and the kilns in which the water has an opportunity to separate from the gas.

Fig. 4 illustrates the layout of such a producer-gas plant in conjunction with shaft kilns. The producers are specially adapted for gasifying brown coal and are strongly contracted towards the bottom in order to confine the zone of combustion to a narrow space. The producer is without any grate. The ashes drop at the bottom

of the producer into a water sump from which they can be withdrawn after quenching. The gas produced is first led upwards and then across the bent *b* downwards into the downtake *c* from which it enters into the gas flue *d* which, by a damper, can be cut off from the gas flue *c*. From the horizontal flue *d* the gas ascends through vertical uptakes and is then distributed over the kiln.

It has already been pointed out that it is difficult to attain a uniform distribution of the gas in round or slightly oval shafts. In the present case the shaft area has therefore been formed as a long drawn out rectangle. These kilns have proved very successful when worked with brown coal producer gas and may also be heated with peat gas. As large lignite and peat deposits are available in the United States the experiences gained in Germany with these fuels may in some cases be utilized there also.

Rumors of New Cement Plant in Colorado

THE PROPOSED building of a new cement plant at Carlile, about eighteen miles west of Pueblo on the Arkansas river, was the principal matter for discussion at the regular meeting of the Pueblo real estate exchange at the regular meeting of that organization recently.

Dr. G. D. Cummings, of Florence, was a guest of the real estate exchange and explained the plans for the erection of the new plant. He explained that the new plant would cost about \$750,000 and that it was expected that construction would be started in the early spring. The proposed plant is to be located on a large tract of land deeded to the company for that purpose and its capacity is to be 2000 bbl. of cement a day.—*Pueblo Chieftain*.

Atlanta Concrete Brick Plant

A. P. BURKE, president of the Atlanta Sand and Supply Co., Atlanta, Ga., is president and general manager of a new Shope concrete brick company, which has recently completed a thoroughly up-to-date plant in Atlanta, about which we shall have more in a subsequent issue.

Fresno, Calif., Company Will Work Large Deposit for Gravel and Gold

NEWS reports from Fresno, Calif., say that the Service Rock Co. has leased 600 acres of land on the San Joaquin river and will spend \$300,000 on a plant to wash gravel and recover gold.

Tests conducted by the Twining Laboratories of Fresno show the content of gold to be so high that the company expects to obtain about \$2500 worth monthly.

Gold operations, however, it was announced, will be merely a side issue, the precious metal being a "byproduct" of the undertaking which is devoted to gravel and sand operations with H. W. Jones, as general manager. Jones is said to be a veteran in this work, having directed other companies in Fresno for the past 10 years.

The holdings of the Service Rock Co., according to the report of H. G. Burrows, appraisal engineer of San Francisco, will supply a half million tons of gravel and sand annually for 50 years.

Three grades of sand, said to be suitable for all sorts of building where cement is used, are contained in the 600 acres leased by the concern. One of these grades, the manager announced, is the same that is now being shipped into the valley from Berkeley.

The company is owned by local capital. Engineers will arrive soon, the manager said, to start surveying and lay plans for immediate entrance into business.

One of the features of the undertaking is the use of a five-yard dragline which will handle 40 tons of material in five minutes.

Long-Time Strength Tests on Alumina Cement

TESTS on *ciment fondu*, the trade name for one of the French alumina cements, reported in a recent issue of *London Engineering*, show that the strength of concrete made from the cement increases consistently up to three years. The tests were made under the supervision of M. Le Gavrian, of the French Ponts et Chaussees, upon a concrete made up in the proportion of 400 kg. of cement, 300 liters of sand, and 900 liters of gravel 1:1.2:3.6; from 7.9 to 8.7 per cent of water was used. Two cements, the first received in the laboratory in October, 1915, and the other received in March, 1916, were used. The strengths in pounds per cubic inch were as follows:

Age When Tested	—Cement A—		—Cement B—	
	In Open Air	Under Water	In Open Air	Under Water
1 day.....	.....	.....	1,673	.....
2 days.....	.....	.....	3,520	.....
3 days.....	4,444	3,945	4,622	3,799
7 days.....	4,480	4,551	6,080	5,880
28 days.....	5,260	4,727	7,685	7,360
90 days.....	5,510	5,180	8,365	8,020
6 months.....	6,040	.....	8,900	8,600
1 year.....	6,631	.....	9,353	9,103
2 years.....	6,827	.....	9,493	8,960
3 years.....	6,730	.....	9,707	9,350

Officers of Ohio Sand and Gravel Association

OHIO Sand and Gravel Producers' Association has elected the following of—Earl Zimmerman, vice-president; F. C. Fuller, secretary-treasurer; and Guy C. Baker, executive secretary. The directors are H. R. Gill, F. D. Coppock, Edw. Donnelly, M. A. Evans and F. E. Hall. Dues were fixed at \$25 per year.

The Ohio Macadam Association

Holds Annual Meeting at Columbus and
Has Conference with State Highway Officials

THE annual meeting of the Ohio Macadam Association was held at Columbus, Ohio, January 29-30.

The meeting began with the usual annual reports in which it was shown that the association was in good shape with a cash balance of \$1525.12.

Mr. Chas. McIntire addressed the meeting on highway problems and taxation conditions. He offered a resolution which will be considered at a future meeting.

Then followed a two-hour general round table discussion of future program and policy. This round table proved to be one of the most interesting the association has ever had. How to combat expensive advertising and misleading statements with reference to high cost types of roads. Second, attitude on federal-aid road appropriations and distribution. Third, attitude on gasoline tax and distribution thereof. Fourth, the attitude of the public on increasing taxation.

Other questions by those present were also discussed. Unanimous agreement was reached that the price of stone and the profits thereon would not permit this association to enter into a competitive advertising campaign such as the paving brick interests were doing. Macadam members and allied interests were urged to personally visit their local newspaper editors and appeal to these editors to assist in getting an



Edward E. Evans

economical road program adopted in Ohio.

Agreement was reached to hold a general meeting of macadam interests at Columbus, Thursday, February 14, 1924, at 10 a. m., after which the meeting adjourned.

Conference with State Highway Officials

The conference with the state highway officials was held at the Columbus Athletic Club on the afternoon of January 29. President Evans presided.

State Highway Director L. A. Boulay, Chief Engineer Geo. F. Schlesinger, Chief of Maintenance Harry Kirk, Major A. Stelhorn, chief engineer of construction; A. S. Rea, chief engineer for testing road materials, and Robert N. Waid, deputy state auditor, were present and discussed various phases of highway policies, finance, maintenance, etc.

H. M. Sharp of the France Stone Co. gave an interesting talk with reference to some proposed changes in macadam plans and specifications. The interest in this afternoon meeting held the crowd until nearly 5:30 p. m.

The Dinner

The dinner was held at 6:30 the same evening and after the members and guests

had eaten, speeches and addresses were made by the following persons: Geo. F. Schlesinger; Chas. V. Truax, state director of agriculture; W. H. Hoagland; Allen Patterson; H. C. Ramsower of Ohio State university; L. A. Boulay, director of highways; M. E. Thraillkill, Columbus attorney; P. K. Sheidler; Cyrus Locher, director of commerce; G. R. Lewis, state grange lecturer and state fair manager; C. R. Wagner, state farm institute lecturer; Chas. McIntire; A. S. Rea, and Thos. V. Hendricks of the Adams Bag Co., Chagrin Falls, Ohio.

Few dinner programs ever pleased an audience better than this one. Director Boulay proved to be the cleverest story teller, with Mr. Hoagland a close second. The high spot was Mr. Hendricks' entertaining lecture, "Coming Through the Wry." This polished address has won applause in many states.

M. E. Thraillkill, noted Columbus attorney, made the real macadam speech, giving figures and results to prove his claim that macadam roads were the most economical and serviceable when rightly built and maintained, not only in this country but in the several European countries in which he traveled and observed highways.

The following officers and directors were chosen for the year:



W. J. Keever



Harry H. Brandon

President—Edw. E. Evans, Toledo.
 First Vice-President—Harry H. Brandon, Piqua.
 Second Vice-President—G. H. Faist, Toledo.
 Treasurer—W. J. Keever, Columbus.
 Secretary—A. P. Sandles, Columbus.
 Executive Committee—Edw. E. Evans, Toledo; H. M. Sharp, Toledo; W. J. Keever, Columbus; O. A. Brand, Cleveland; Harry Brandon, Piqua.

Board of Directors—Edw. E. Evans, Whitehouse Stone Co., Toledo; W. J. Keever, Marble Cliff Quarries Co., Columbus; O. A. Brand, The Barrett Co., Cleveland; G. H. Faist, Woodville Lime Products Co., Toledo; H. M. Sharp, France Stone Co., Toledo; Harry Brandon, Ohio Marble Co., Piqua; J. S. Wetherill, John Herzog & Son, Forest; F. R. Patterson, Bluffton-Lewisburg Stone Co., Lima; B. T. Van Camp, Van Camp Stone Co., Cincinnati; E. W. McCall, Tarbox & McCall Stone Co., Findlay; L. E. Beeghly, Standard Slag Co., Youngstown; C. C. Beam, Melvin.

The members present were:

O. A. Brand, the Barrett Co., Cleveland; Chas. L. Harrison, the Barrett Co., Cincinnati, and Richard Sinclair, the Barrett Co., Columbus; Edgar Files, Allen Patterson, F. R. Patterson, L. E. Patterson and O. A. Scott, Bluffton-Lewisburg Stone Co., Lima; Frank McElroy, Bluffton-Lewisburg Stone Co., Bluffton; H. E. Bair and H. M. Sharp, France Stone Co., Toledo; J. S. Wetherill, John Herzog & Son, Forest; Russell Rarey and W. J. Keever, Marble Cliff Quarries Co., Columbus; C. C. Beam, Melvin; Harry Brandon and Chas. L. Suessman, Ohio Marble Co., Piqua; Walter R. Culverston and Chas. McIntire, Standard Slag Co., Youngstown; Frank Tarbox and E. W. McCall, Tarbox McCall Stone Co., Findlay; B. T. Van Camp, Van Camp Stone Co., Cincinnati; E. E. Evans, Whitehouse Stone Co., Toledo; G. H. Faist and Chas. R. Sapp, Woodville Lime Products Co., Toledo; A. P. Sandles, secretary, Columbus; Claude L. Clark, assistant secretary, Columbus.

Michigan Gravel Company Produces More in Single Month of 1923 Than in All 1922

THROUGH the use of the new hydraulic suction dredge which has been installed at the gravel pit of the Central Michigan Gravel Co. that firm has been able to make the past year the greatest in its history. The business has grown to such an extent during 1923 that the gravel and sand handled in October was more than the entire output in 1922.

The new machinery added to the extensive equipment formerly used by the Burwell Gravel Co., predecessor to the present owners, cost more than \$40,000. The principal addition has been the dredge barge, which is of the latest type and which was launched in Sycamore creek on the east border of the company's property, from which it sucked its way into the present miniature lake in which it works.

The dredge is working at a depth of 25 ft. and it is estimated that the gravel of the pit extends at least 20 ft. further. The ridge rises a sheer 65 ft. above the water level, giving a gravel bed of 90 ft. being worked at present, and this will be 110 ft. before bottom is reached. It is estimated by the

company that at the present rate of production the pit will produce high-grade sand and gravel for the next 15 to 20 years at the end of which time the 80-acre property will be entirely converted into a lake 45 ft. deep.—*Lansing, Mich., Journal.*

Gold in a Missouri Sand and Gravel Pit

A REPORT from Kansas City gives the following account of finding gold in Missouri sand and gravel:

While working a sand and gravel pit at Wheatland, Mo., Preston Hall of Hermitage, Mo., discovered several small particles in the sand. Mr. Hall did not think very much about it at the time, but later he and A. A. Hobbs of Cross Timbers found more of the peculiar specimens which they sent to the School of Mines at Rolla, Mo.

A letter was recently received by them from M. H. Thornberry of the School of Mines which said: "The small samples which you sent us have been examined and tested and I wish to advise you that they are high grade gold ore. There is no need of assaying a sample of this character because it would be marketable as it comes from the ground."

Mr. Hall, Mr. Hobbs and A. D. Short of Cross Timbers, Mo., have a lease on the property which extends along a small canyon which they have been working for the sand and gravel. From indications it appears this has been worked before, possibly hundreds of years ago, either by Indians or Spaniards. The formation is quartz, sandstone with traces of iron. The land is rough and has been set to fruit trees. The men are now wondering how much gold ore they have been hauling out of the pit with the sand and gravel.

Gold in sand and gravel deposits is reported occasionally from many parts of the United States. Glacial deposits in Indiana have been worked for gold in a commercial way, according to old mining men.

Government Suit Against Cement Makers to Be Settled

THE Kansas City *Post* says that the cement companies, against which the government brought suit, as reported in recent issues of this paper, have decided to accept a decree of judgment. The paper's account follows:

The Norcross Audit and Statistical Bureau and six affiliated cement companies, it is understood, have agreed to accept a decree of judgment in the injunction suit brought to restrain the operations of the bureau in its alleged attempt to control the price of cement.

Representatives of the cement companies say the operations of the bureau were abandoned two years ago when the United States Supreme court handed down a decision in a similar case, declaring the operations illegal.

A decision for the government in a case

similar to the proceedings instituted in Kansas City was handed down recently by the New York federal courts. C. C. Madison, United States district attorney, prepared copies of a decree of judgment similar to the decision of the New York courts and forwarded them to attorneys for the cement companies with the recommendation that the judgments be accepted without trial.

The injunction suit was filed in the Federal court here October 25, 1921. The defendants were charged with violation of the Sherman anti-trust act in conspiring to restrain interstate commerce.

The defendants named in the suit:

Norcross Audit and Statistical Bureau.
 Bonner Portland Cement Co.
 Dewey Portland Cement Co.
 Monarch Cement Co.
 Oklahoma Portland Cement Co.
 Western States Portland Cement Co.

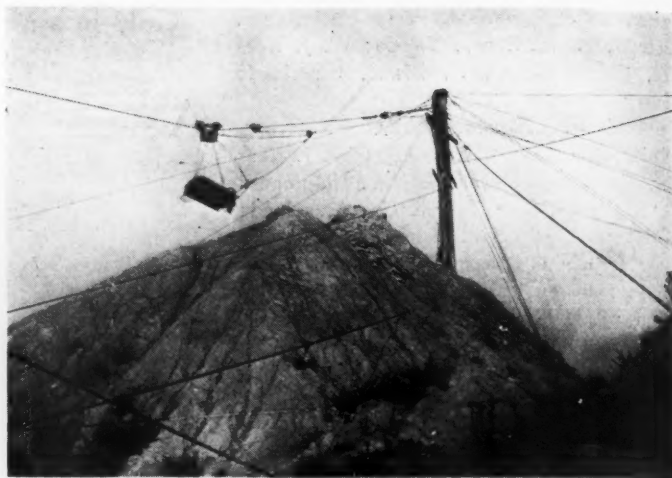
Standards for Fine Aggregates

WITH proper qualification, the standard briquet test can be utilized to study the mortar making properties of sands. Perhaps because of too much deference to precedent, the mortar-briquet test has been widely assumed as indicating the concrete making properties of sand and screenings. It is customary to specify that any sand proposed as fine aggregate must produce a mortar at least equal in tensile strength to a mortar made with the same proportions of cement and standard Ottawa sand.

So far as concrete pavements are concerned, this criterion for fine aggregates may be misleading. The briquet test certainly cannot be taken as an indication of the strength to be expected from concrete in which the same sand would be used. In briquet making, or mortar cylinders for compression tests, the percentage of mixing water varies within narrow limits usually not less than 9 nor more than 16 per cent by weight of the cement. In mixing concrete, the proportion of mixing water runs from 5½ to 9 gal. per sack of cement or from 48 to 80 per cent by weight of the cement. In view of the fact that the strength of concrete (or mortar) is largely controlled by the water-cement ratio, it seems evident the briquet and cylinder mortar mixtures cannot be expected to indicate results in pavement practice.

There are much more satisfactory ways of studying fine aggregates than by comparing mortars with standard Ottawa. Careful visual examination—especially with a small magnifying glass—together with a sieve analysis, will indicate whether washing may be necessary. The sieve analysis will give quick clues to those proportions necessary for any desired concrete strength. The colorimetric test (prolonged to 48 or 72 hr.) will indicate presence of organic impurities and possible necessity of further chemical analysis. Standard 6x12-in. concrete cylinders, made from the fine and coarse aggregates about which information is desired, will indicate the strengths that can be secured with given consistencies and proportions. — *Concrete Highway Magazine.*

Hints and Helps for Superintendents



Left: The piled strippings. Right: Close-up of bucket dumping on pile

Improved Cableway Dragline Used for Stripping a Quarry

By A. B. Sanger

[As Mr. Sanger points out, the cableway dragline, much used in sand and gravel operations, resembles the standard method of hoisting slate from a quarry. It is natural therefore that a quarry operator should have devised a similar machine for stripping. Those acquainted with the sand and gravel machines will be interested in noting differences between the two. The application of the dragline for stripping is not, of course, confined to slate quarries and it might be profitably used wherever the nature of the soil to be stripped and other local conditions would permit.—Editor.]

THE usual method of slate quarry stripping is to use either a steam shovel or a gang of hand shovelers, loading into either cars or trucks. The last method is expensive work at its best and is especially annoying during these trying days of labor-shortage.

At the quarry of the H. B. Williams Slate Co., of Granville, N. Y., the management is using a method which is a radical departure from the usual procedure. Many years ago Mr. Williams realized that to handle an overburden of from 30 to 40 ft. by hand was to invite financial disaster. So he designed and patented a special type of drag scraper which could be operated by one man and at the same time give maximum production.

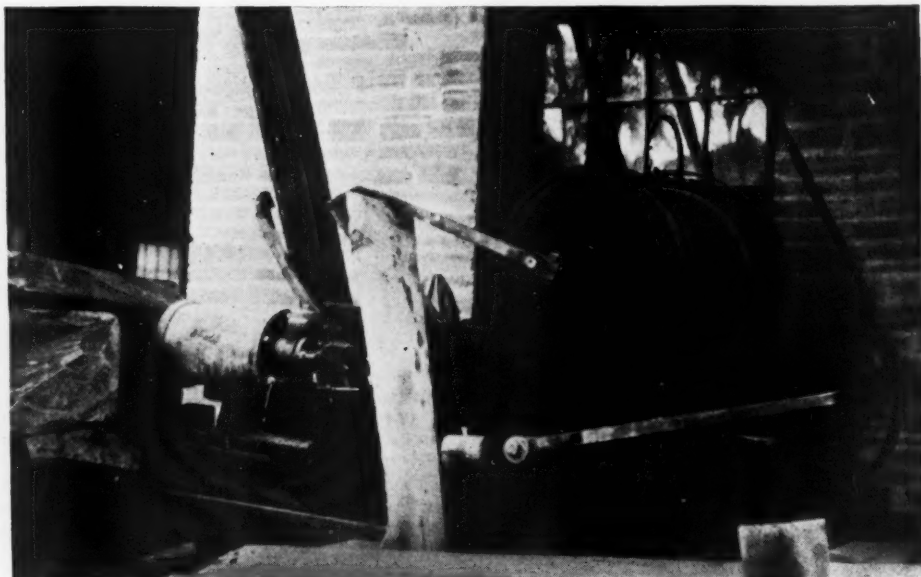
The system as a whole closely resembles the standard apparatus for hoisting slate

from the pits. One end of the large carrying cable is fastened to a "dead-man," but by a bridle arrangement is given considerable lateral adjustment. The other end passes through the top of a guyed tower or "stick" about 60 ft. high and goes to a fixed anchor. At the tower is one of the few differences between the two systems. Usually the cable is a fixed entity but in this case part of it is replaced by a "block and fall" system which is connected to the hoist. By means of this the large cable may be lengthened or shortened. When it is desired to lower the scraper, the tension cable in the block is released and the apparatus drops of its own weight; when it is desired to lift the system, pull is exerted and the cable shortened.

The scraper, which is like a flat bot-

tomed scoop, is more an integral part of the carriage than a separate piece of apparatus. On it there are two chain systems. One acts only as a stabilizer in the loading and dumping. It is fastened to the front and rear of the scoop and passes up over a sprocket in the carriage; it acts as a sort of tilting device but is not under any control. The other chain acts as the dumping medium. This is fastened to both front and rear but is also carried over sprockets in the carriage and then passes out ahead to a "pilot" carriage. It is then connected with the drag cable which is fastened to the front of the scoop.

Let us follow the scraper through "one round." It has dug its nose into the bank of sand, gravel and clay and is being dragged forward. Once the load is obtained, the tension rope on the block sys-



The two-drum hoist by which the dragline is operated



Bucket and chain system

tem is pulled, thus taking up the slack and lifting the entire apparatus from the ground. At the same time the forward movement is continued and as long as this is uninterrupted, there is no tendency for the scoop to dump its load.

However, near the tower there has been placed on the main cable a heavy block. When the pilot carriage reaches this block, the pull on the drag line ceases to act upon the front of the scoop but is transmitted by the chain system mentioned previously to the back of the scoop and thus upends it.

When the load has been dumped, tension on both the drag and "block" cables

is released at the hoist. The carriage with the scoop runs back by gravity and the system sags to the ground. Meanwhile, the scoop straightens itself out by means of the tilting chain.

Hoisting is controlled by a double drum hoist geared to a 52-hp. induction motor. One of the drums carries the control cable leading to the "block and fall" system; the other drum carries the main drag cable. Each control cable is $\frac{3}{4}$ -in. while the main cable is $1\frac{1}{2}$ -in. The hoist house is so situated as to give the engineer an uninterrupted view of the entire operations.

When working in good ground, the $1\frac{1}{2}$ -yd. scoop makes about 4 trips every 5 minutes with only one man in charge. Thus far he has been able to keep ahead of the quarry crew despite the fact he has about 40 ft. overburden across a width of 100 ft.

This system has been used for more than ten years and is proving such a success that other slate men are considering its adoption. Certainly it is unique and far more efficient than hand stripping.

Raised Loading Tracks in Quarry

THE two views herewith show a unique method of shovel loading in a quarry having a very high working face. The quarry is that of the Granite Rock Co., Watsonville, Calif., an operation described in detail elsewhere in this issue.

The average height of the quarry face is 180 ft. A Model 50 Marion steam shovel on traction wheels is used for loading; 15-ton Porter steam locomotives and 12-car trains of Western dump cars are used to transport the rock to the crusher.

Instead of having the tracks on the quarry floor, they are raised, as the views show, on a fill about 6 ft. high. This fill is made by the shovel. The larger fragments of rock, too big for the crusher,



Shovel going through and building new embankment of pieces too large for the crusher

are placed in this fill and the rest is spoil and waste from the crushing plant.

Three advantages claimed for having the loading tracks on this fill are: (1) The fill at the toe of the quarry face forms a dike or dam to prevent the rock spreading out over the quarry floor after a blast, as well as preventing damage to the track; (2) the presence of the fill furnishes a toe for the shovel to work against and thus ensures full buckets with the least effort; (3) loading cars on an elevated track saves dropping the dipper stick and therefore eliminates one part of the shovel operation. This latter saving, in the aggregate, saves a good deal of the shovel's working time. W. J. Wilkinson is the superintendent.



The bucket starting to dig



The shovel saves time by not lowering the dipper

Sand-Lime Brick Convention

Buffalo Convention of Sand-Lime Brick Association Marks Advancement Made by the Industry—Toronto Selected for Next Meeting

THE twentieth annual convention of the Sand-Lime Brick Association was held at the Statler Hotel, Buffalo, N. Y., February 5 and 6. As is typical of the meetings held by this association the two days were devoted to papers dealing with improvements in the manufacture of sand-lime brick, as well as with research work being conducted to further improve the quality. These papers were all of a very interesting nature and some will be reprinted in future issues of *ROCK PRODUCTS*.

One of the high lights of the meeting was the discussion of the decision of the Interstate Commerce Commission to give preferential rates to shippers of common brick and in its order it did not classify sand-lime brick in this class. The traffic committee appointed by the association made quite an effort to eliminate this discrimination, but due, perhaps, to lack of time and proper representation, did not gain their point. Further action on this was left in the hands of the executive committee. The general sentiment regarding this was that the sand-lime brick interests join the concrete brick interests in a concerted fight to get the order revised by the I. C. C. to include these two products.

Warren E. Emley, Bureau of Standards, Washington, D. C., read several very important papers prepared by H. V. Johnson of the sand department. One of these was on "The Effect of Grading of Sand Upon the Properties of Sand-Lime Brick." This paper dealt with the research work done by the bureau and the conclusions drawn were as follows:

1. With an increase in fine material, a greater duration of pressure is necessary in order that the indicating beam of the testing machine may represent the same stability; this increase will also result in more expansion of the material on releasing the pressure, and also during the steaming.

2. The tensile, transverse, and compressive strengths of sand-lime bricks are increased as the proportion of very fine material passing a No. 100 sieve is increased.

3. This increase in strength is not limited to that increase in fine material which results in greatest density, but increases with further additions of fine material, which undoubtedly facilitates the chemical reaction—that which produces the bonding material in the brick.

4. The average ratios for the tensile strength, modulus of rupture and com-

pressive strength were found to be, in these experiments 1:2 and 5:14. The ratio of modulus of rupture to compressive strength is 2:5:14 or 1:5:6, as compared to a ratio of 1:4:6, taken as an average ratio from the makers of commercial sand-lime bricks.

5. The disadvantages attendant upon adding very fine material to such an extent that the density decreases, is the resulting increase in absorption.

Two other very interesting papers by Mr. Johnson on the "Effect of Pressure and Steaming on the Compressive Strength of Cement-Lime Mortars" and "Relative Values of Ten Per Cent Lime and Ten Per Cent Portland Cement, by Weight, for Making Sand-Lime Bricks" were read.

The dues of the association were fixed at \$15 as a minimum up to 5,000,000 brick. Over and above that each member will pay \$1 per million brick produced. This change in assessment will add materially to the association's budget.

The officers for 1924 were all re-elected for 1924 with the exception of Secretary J. S. Palmer. The officers are as follows:

J. Morley Zander, president, Saginaw, Mich.; H. W. Terry, vice-president, Toronto, Ont.; G. W. Phelps, secretary, Flint, Mich.; Allen G. Walton, treasurer, Hummelstown, Pa.

The following comprise the executive committee:

W. H. Crume, Dayton, Ohio; Irwin G. Toepfer, Milwaukee, Wis.; Otto Schwartz, New Orleans, La.; W. D. McFarlane, Winnipeg, Canada; A. S. Wolfe, Washington, D. C.

The next convention of the Sand-Lime Brick Association will be held in Toronto, Ont., the date to be fixed by the executive committee.

Program of the Convention

Morning Session—Tuesday, February 5—10:00 o'Clock

Enrollment.

President's Message.

Report of Secretary and Treasurer.

Appointment of Committees—Audit, Nomination, Resolutions.

Thawing Sand in the Pit—Paper by H. O. Joseph, Grande Brick Co., Grand Rapids, Mich.

Afternoon Session—1:30 o'Clock

1. Tests and Standards—Report of Committee. Paper by W. H. Crume, Crume Brick Co., Dayton, Ohio.

2. Report of Associational Work Done at Washington—W. H. Crume.

3. The Effect of Grading of Sand on the Properties of Sand Lime Brick. Paper by H. V. Johnson. Read by Warren E. Emley, Bureau of Standards.

4. The Brick Situation in Toronto. Paper by H. W. Terry, Toronto Brick Co., Toronto, Ont., Canada.

5. Twelve Years' Progress in the Manufacture of Bricks. Paper by I. G. Toepfer, Acme Brick Co., Milwaukee, Wis.

Morning Session—Wednesday, February 6—9:00 o'Clock

1. Traffic Committee—Report. Paper by J. S. Palmer, Sebewaing Brick Co., Sebewaing, Mich.

2. Advertising. Paper by C. A. Breskin, Rock Products, Chicago, Ill.

5. New Developments of the Past Year. Paper by W. H. Crume, Crume Brick Co., Dayton, Ohio.

Luncheon 12:15 to 2:00—For Men and Ladies

1. Eulogy on Mr. Goho. W. K. Squier, Paragon Plaster Co., Syracuse, N. Y.

2. China and Japan. John L. Jackson, Jackson & Church Co., Saginaw, Mich.

3. Local Speaker from Buffalo. Robert Summers, Buffalo, N. Y.

Afternoon Session—2:00 o'Clock

Unfinished Business.
Report of Committees.
Election of Officers.
Round Table.

Registration

American Brick Co., Boston, Mass.—C. H. Carmichael. American Brick Co., New Orleans, La.—Otto Schwartz. Acme Brick Co., Milwaukee, Wis.—I. G. Toepfer.

Boice Brothers, Pontiac, Mich.—E. C. Boice. Belt-Line Brick Co., Minneapolis, Minn.—H. H. Gould and John Zellie. Buffalo Sandstone Brick Co., Buffalo, N. Y.—L. Hossenlopp.

The Crume Brick Co., Dayton, Ohio—W. H. Crume, R. C. Kiser.

Bureau of Standards, Washington, D. C.—Warren E. Emley.

El Paso Building Material Co., El Paso, Texas—C. L. North.

Flint Sandstone Brick Co., Flint, Mich.—G. W. Phelps.

Grande Brick Co., Grand Rapids, Mich.—H. O. Joseph.

Hadfield-Penfield Steel Co., Willoughby, Ohio—L. W. Penfield.

Harbour Brick Co., Toronto, Ont., Canada—H. W. Terry, H. D. Robertson.

Hummelstown-Brownstone Co., Hummelstown, Pa.—Allen K. Walton, Allen G. Walton.

Jackson & Church, Saginaw, Mich.—John L. Jackson, J. W. Van Brunt.

North Indiana Brick Co., Michigan City, Ind.—F. C. Dall.

Paragon Plaster Co., Syracuse, N. Y.—W. K. Squier, F. M. Boggs.

Rochester Sand and Brick Co., Detroit, Mich.—J. G. Schluchter.

Rock Products, Chicago, Ill.—Charles A. Breskin.

Rochester Composite Brick Co., Rochester, N. Y.—H. G. Speth.

Sand-Lime Products Co., Detroit, Mich.—J. V. Kotting.

Sebewaing Sandstone Brick Co., Sebewaing, Mich.—J. S. Palmer.

Saginaw Brick Co., Saginaw, Mich.—J. Morley Zander.

Toronto Brick Co., Toronto, Ont.—Harry Race.

The Winnipeg Brick Co., Winnipeg, Can.—W. D. McFarlane.

Louisville Cement Co., Louisville, Ky.—D. M. Gray, W. F. Irwin, Jr.

Celite Products Co., Buffalo, N. Y.—W. D. Van Annan.

Choctaw Company's Cement Plant to Be Sold February 15

ACCORDING to the Muskogee, Okla., *Democrat*, a tentative date for the sale of the plant of the Choctaw Portland Cement Co. at Hartshorne, Okla., will be fixed as February 15 in an order for sale to be presented soon to Judge Frank Youmans in United States district court.

With the fixing of the date for the sale a sparring match between the "cement trust" and independent interests for possession of the plant is expected to ensue. The plant has been appraised by officers of the court at \$261,000, according to attorneys in the case.

The order for sale now being drawn is the result of an agreement between contesting parties to litigation in the federal court. The Hartshorne plant has been tied up several years. Frequent reports of price-cutting and other forms of pressure on the part of the "cement trust" have entered into the discussion of the case.

In the order for sale it will be stipulated that bonds of the company may be offered at their face value should the bondholders decide to bid in the property. Grant C. Stebbins of Tulsa, widely known Oklahoma oil man, is both a stockholder and a bondholder in the company, and it is rumored he may form a coalition of bondholders to bid in the property.

The sale will be conducted by W. D. Ege of Tulsa, as trustee in bankruptcy for the company. He will be authorized to receive and catalog all bids, and Judge Youmans will have the final say in adjudicating the bids and disposing of the property. Every effort will be made to put the sale through in time for the reopening of the plant before spring. Henry L. Fist of Tulsa, former Muskogean, is attorney for the trustee.

P. G. Walker of Tulsa is the present head of the company. On several occasions the stockholders attempted to put the company's affairs in shape so that the plant could be sold to the state of Oklahoma as the first of the state-owned cement plants contemplated in the Waltonian program of the ninth legislature. Representatives of Pittsburg county were ready and willing to assist the stockholders in their attempt to sell the plant to the state, but because of the conflicting financial interests involved, the deal never could be put through.

The Hartshorne plant never has participated in Oklahoma's road-building boom, according to persons interested in

the case. It operated a year or more on full time, but the profits from this operation were wiped out by judgments in damage suits arising from alleged faulty material furnished contractors. Most of the stockholders live in Tulsa, but there are a large number of stockholders scattered throughout Oklahoma.

Rival Cement Companies Buy Limestone Lands in Ohio

DISCOVERY of large areas of limestone containing a small percentage of magnesia, suitable for cement making, in the Reed's Hill neighborhood in the vicinity of Osborn and Fairfield, Ohio, has resulted in the activities of rival Portland cement companies, both of which have secured control of hundreds of acres of farm lands in Bath township through options and purchase.

The Southwestern Portland Cement Co., with headquarters at Los Angeles, has filed in the office of the Greene county recorder options valued at close to \$200,000. On 532 acres, including the 302-acre farm of C. J. Reed, part of which is the famous Reed's Hill, which is said to be composed almost entirely of the limestone. The company has taken an option on this farm for \$375 an acre, a total of \$113,250.

Among the options is a site on the Fairfield and Xenia pike lying partly in the village of Osborn, said to have been secured for a factory location.

The Wabash Portland Cement Co., with main offices at Detroit, has secured the title to two farms in the same section. A farm of 109 acres belonging to the estate of Aniel Powers was bought for \$15,000, and 20.68 acres on the M. M. Harner for \$7900. The Powers farm is said to have been bought for a factory site because of its railroad facilities, the Big Four and Erie roads running through it.

The Wabash Co. also has on file a dozen or more options it has taken on Bath township property.

The following options controlled by the Southwestern Portland Cement Co. have been filed with the county recorder: 17.42 acres owned by the Osborn Removal Co., \$8500; 30 acres, Joseph and Maggie Shade, \$15,000; 302 acres, C. J. Reed, \$113,250; 69.39 acres, J. C. Eckles estate, \$21,000; 49.6 acres, J. D. and Margaret Burall, \$15,000; nine acres, Charles and Winona Furay, \$4300; 20 acres, Ray and Pearl Wilson, \$9000; 22 acres, T. V. and Jessie Darner, \$8800; 1250 acres, William and Cora Ashbaugh, \$5000.—*Springfield, Ohio, News.*

Signal Mountain Portland Cement Co. to Enlarge Its Plant

AT a meeting of the stockholders of the Signal Mountain Portland Cement Co. the directors were authorized to proceed as rapidly as possible with the installation of the third and fourth units in order to bring the output of the plant up to 5000 bbl. per day, for which the mill is designed. Officers elected were: W. A. Sadd, chairman of the board; John L. Senior, president; C. S. Steward, vice-president; J. L. Caldwell, second vice-president; J. P. Hopkins, secretary and treasurer; M. L. Carter, assistant treasurer, and P. S. Steward, assistant secretary.

A description of the Signal Mountain plant was published in the December 29 issue of *ROCK PRODUCTS*.

Yosemite Portland Cement Co. to be Ready in the Spring

WORK is progressing rapidly at the plant of the Yosemite Portland Cement Co. and Engineer Steinmetz, in charge, stated recently that there is no doubt that everything will be in readiness for the starting of work of production early in the spring.

A good sized force is at work in the drafting department of the temporary office building laying out the blue prints for the plant here and at the Jenkins Hill quarry. The plans for the crusher and loading chutes at Jenkins Hill show a plant which will crush 12 carloads of material daily.

The two railroad lines of the Yosemite Valley railroad in the yards of the plant are complete, the one to bring in the raw material requiring a fill of considerable depth. The hoist to lift the material to the plant is now being built and a large number of men are employed in putting down the foundations for the heavy machinery, some of them being 20 ft. in the ground. Machinery is arriving every day and more is on the way. It will be placed as rapidly as the foundations are completed and the buildings constructed around and over it.

Col. Leigh Hunt, the designer and builder, who has been in the East getting out the machinery, will arrive here in a week or two.—*Merced, Calif., Star.*

Additions to Texas Portland Cement Co.'s Plant are Planned

THREE additions to the Texas Portland Cement Co.'s plant will be made in the next 90 days at a cost of \$15,000, according to the *Houston (Texas) Post*.

A steel and stucco addition to the kiln building is the largest of the three projects. It will be 267 ft. in length, 20 ft. wide and 45 ft. high and will cost \$10,500. An addition to the raw mill, 72x24 ft., is to be made at a cost of \$3000 and an extension of the cooler building at a cost of \$1500.

Production of Slate in 1923

An Increase of Almost 11 Per Cent in Quantity
and 32 Per Cent in Value as Compared with 1922

THE sales of roofing slate, mill stock slate and slate granules by producers in the United States in 1923 amounted to 673,500 short tons, valued at \$12,085,000, according to reports received by the Department of the Interior through the Geological Survey. These amounts represent an increase of nearly 11 per cent in quantity and 32 per cent in value, as compared with the sales in 1922. The sales of roofing slate were estimated at 498,500 squares, valued at \$4,554,000, an increase of 4 per cent in quantity and 12 per cent in value. The average price was \$9.14 a square. The mill stock sold was estimated at 12,089,700 sq. ft., valued at \$4,460,000, an increase of more than 30 per cent in quantity and 54 per cent in value. The sales of all milled slate products, except slate for billiard table tops and for school slates increased during 1923. Most of the school slates manufactured are shipped to foreign countries, and the unsettled social and political conditions abroad have evidently reduced the demand for this product. The demand for constructional slate was very good during the first half of 1923, but the curtailment of building greatly lessened the demand for this class of material toward the end of the year. The demand was good throughout the year for electrical slate and slate for blackboards and bulletin boards. Ground slate sold as flour and as granules, principally for surfacing manufactured roofing, amounted to 413,500 short tons, valued at \$3,026,000. This represents an increase of more than 8 per cent in quantity and 39 per cent in value over the corresponding amount for 1922. The quantity of slate sold for flagstones is increasing, and a little is sold for tombstones. The accompanying table, which is given on the lower part of this page, shows

the estimated sales of slate in 1923 and the corresponding amounts for 1922 for comparison.

New Gypsum Insulating Material

FRANK G. ORR & CO., 17 Blythwood Square, Glasgow, Scotland, are attempting to introduce into the United States and Canada a new gypsum insulating material claimed to be the equal of the magnesia-asbestos mixtures and much cheaper in cost. Either vegetable or asbestos fibre may be used as a binder, the connecting material being calcined gypsum.

Here are some of the claims made for it:

"Heat is not essential in the boilers or pipes when being covered, as this material sets within 30 minutes, the moisture only having to evaporate.

"It is mixed to a plastic consistency with water, and there are no chemicals in its composition which can affect any metal.

"It is an equally efficient composition for use as a sound deafener in ship and building construction, such as floors, partitions, etc.

"The minimum of mechanical plant is necessary in the manufacture. The simplest form of molding or casting can be employed, and the labor need only be semi-skilled, consequently it can be produced on the most economical principles.

"There is the minimum of waste, as when molded or cast, it does not crumble with careful handling.

"The finished surface can be waterproofed or painted any desired color. It is fireproof, as it is composed of mineral matter only.

"It contains millions of microscopical air

cells, and consequently has high insulating properties.

"Only 5 per cent asbestos or vegetable fibre is necessary as a binder in place of 15 per cent as in 85 per cent magnesia asbestos.

"When applied in sections or slabs it is a cleaner material to handle than any other, as it is of a firm consistency when cast.

"Its covering capacity is approximately 560 sq. ft., 2 in. thick, per ton, when applied in slabs or sections, but the covering capacity is increased when applied in situ.

"It can be applied in various qualities and prices, and applied in a similar manner to other plastic compositions, but with one quality, heat is necessary during the application to boilers or pipes. The efficiency is practically the same as the first quality, but the labor in applying same is greater.

"Tests made at the National Physical Laboratory, London, it is claimed, prove that this new insulating material gives excellent results up to a temperature of 850 deg. F, and that no carbon dioxide is evolved at a temperature of 660 deg. F."

The mixture and the process of manufacture have been patented in the United States, Canada, and foreign countries.

Pittsburgh Sand and Gravel Amalgamation

REGARDING the amalgamation of Pittsburgh, Pa., sand and gravel companies, announced in the last issue of ROCK PRODUCTS, the Pittsburgh Gazette-Times says:

George Vang, head of the Vang Construction Co. of Pittsburgh, is to be the head of the Iron City Sand and Gravel Co., which recently took over the Iron City Sand Co. Few changes will be made in the personnel of the acquired company, which will continue doing business as part of the organization of the Iron City Sand and Gravel Co.

Harry G. Pfeil, former president of the company but who recently retired from the sand and gravel business, will be a director, and Joseph A. Hoeveler will continue as general manager.

ROOFING SLATE, MILL STOCK,* AND SLATE GRANULES SOLD IN THE UNITED STATES IN 1922 AND 1923 (ESTIMATED) BY USES

Use	1922			1923 (estimated)			Percentage of increase or decrease	
	Quantity	Total Value†	Average	Quantity	Total Value†	Average	Quantity	Value
Roofing—squares	479,243	\$4,069,761	\$8.49	498,500	\$4,554,000	\$9.14	+ 4.0	+ 11.9
Approximate equivalent in short tons	161,700			168,200				
Electrical—square feet	1,363,300	996,322	.73	2,033,400	1,681,000	.83	+ 49.2	+ 68.7
Approximate equivalent in short tons	9,700			14,500				
Structural and sanitary—square feet	2,131,800	750,653	.35	2,948,300	1,034,000	.35	+ 38.3	+ 37.8
Approximate equivalent in short tons	15,300			21,200				
Grave vaults and covers—square feet	400,100	87,763	.22	630,000	158,000	.25	+ 57.4	+ 80.0
Approximate equivalent in short tons	5,700			9,000				
Blackboards and bulletin boards—square feet	3,518,700	880,985	.25	5,070,000	1,420,000	.28	+ 44.1	+ 61.2
Approximate equivalent in short tons	25,100			36,200				
Billiard-table tops—square feet	383,900	141,445	.37	338,000	135,000	.40	— 12.0	— 4.6
Approximate equivalent in short tons	2,700			2,400				
School slates—pieces	2,766,600	42,027	\$15.19	2,000,000	32,000	16.00	— 27.7	— 23.9
Approximate equivalent in square feet	1,479,000			1,070,000				
Approximate equivalent in short tons	2,000			1,500				
Granules—short tons	379,980	2,177,061	5.73	413,500	3,026,000	7.32	+ 8.8	+ 39.0
Other uses‡ short tons (estimated)	5,500	30,767		7,000	45,000			
Total (approximate quantities in short tons)	607,680	\$9,176,784		673,500	\$12,085,000		+ 10.8	+ 31.7

*In 1922 the mill stock sold, including school slates, was about 9,277,000 sq. ft., valued at \$2,899,195; in 1923 it was about 12,089,700 sq. ft., valued at \$4,460,300. †F.o.b. at point of shipment. ‡Average value per thousand pieces. §Include small quantity of slate sold for flagging (117,754 sq. ft., valued at \$16,906, in 1922), tombstones, and other uses not specified.

Cement Plant Using Natural Gas Fuel for Wyoming

THE Cheyenne, Wyo., *Tribune* says that A. B. Watkins, representing the Wyoming Portland Cement Co., has opened offices in the First National Bank building in Thermopolis, Wyo., preparatory to beginning actual work on a big cement plant that will give employment to from 100 to 140 men. The factory will be located at the north end of town and as soon as weather will permit the Burlington railroad will extend tracks a mile to the site.

The factory is to be of 2000 bbl. daily capacity, the products to be made by natural gas and under a process developed by Watkins, said to cost for the finished product about one-eighth of the present process as far as fuel is concerned.

In addition to the cement there will be departments for lime, gypsum, brick and tile and it is expected that within a short time the capacity will be increased considerably. The company is capitalized at \$2,500,000.

Because there are vast deposits of the natural resources used in the manufacture of each of these products and the fact that one of Wyoming's largest gas fields is at hand, the Wyoming Portland Cement Co. decided upon Thermopolis for the location of its factory in this state.

Watkins has had experience in the building and operation of plants of this kind, having erected in Germany two factories similar to the one contemplated here. Both plants in Germany proved to be highly successful.

Michigan Finally Buys Cement

AFTER seeking fruitlessly for some means of delaying the purchase of cement for highway construction purposes without being left to face rising prices, the State Administrative Board accepted bids for approximately 550,000 bbl., to be delivered by three different companies, at a rate of \$1.75 a barrel, plus freight charges as of Buffington, Ind.

With this amount and the 600,000 bbl. that it is estimated that the convict laborers at the state-leased plant at Chelsea, Mich., will be able to produce, the state will have sufficient cement to lay upwards of 250 miles of concrete highways, as well as make a sizable allotment for the construction of bridges and buildings.

The \$1.75 rate represents an increase of 5 cents a barrel over the price made last year, and will increase the cost of a mile of standard concrete road by \$200.

The bids accepted were made by the Universal Portland Cement Co., of Buffington; the Newaygo Portland Cement Co., of Newaygo, and the Sandusky Portland Cement Co., of Sandusky, Ohio, the first two bidding on 200,000 bbl. apiece, and the Sandusky concern on 150,000 bbl.—*Detroit News*.

P. S. Taylor, Former Southwestern Superintendent, Heads New Cement Company

PHILIP S. TAYLOR, former superintendent of the Southwestern Portland Cement Co. at Victorville, Calif., is now president and general manager of the Guadalupe Cement Co., which is to build a plant near San Jose, Calif. The company is capitalized at \$3,000,000.

The board of directors of the company comprises Phillip S. Taylor, San Jose, Calif., president and general manager; M. F. Hopkins, San Jose, Calif., vice-president; Maurice J. Pope, San Francisco, Calif., secretary and treasurer; W. Sommer, San Francisco, auditor; F. G. Cartwright, San Francisco, director, and John G. Dean, San Jose, superintendent and chemical engineer.

According to information given out by the company, the plant will have a capacity of 2500 bbl. per day. The company's property contains 331 acres and is on the line of the Southern Pacific. The limestone deposit is in the hills above the mill and deposits of volcanic silicious rock suitable for cement making are found on the site. Crude oil is produced in nearby fields and abundant hydro-electric power is available.

Monolith Portland Cement Plant to Make 4500 Barrels Daily

SUBSTANTIAL increases in building and construction work going on in California and other Pacific Coast states has made it necessary for the Monolith Portland Cement Co. to expand its plant at Lehigh, Calif., and increase its capacity, according to C. A. Low, sales manager of the Monolith Portland Cement Co., as reported in Los Angeles papers.

"We are now busily engaged in erecting buildings and enlarging our kilns," said Mr. Low, "and by March 1 we expect our output to be 3500 bbl. a day.

"At that time we also expect to switch over to what is known as the 'wet grinding' process, which is more satisfactory than the method we are now using.

"By June 1 our capacity will be approximately 4500 bbl. of cement a day.

Group Insurance for Oklahoma Portland Cement Employees

ACCORDING to local papers, about 70 employees in the quarries and crusher plant at Lawrence, Okla., met at the school house in Lawrence to hear the plans of the Oklahoma Portland Cement Co. for insuring the lives of its employees. The safety first campaign to be put on was also explained and members to the Oklahoma Portland Cement Co.'s Employees Benefit Association were solicited. Sixty new members were gained as the result of this meeting. A smoker followed.

Cement Manufacturers in Mexico Agitate for Increase in Import Duty

THE foreign trade bureau of the Merchants' Association of New York reports that it has received the following communication from the Mexican Chamber of Commerce in New York relative to cement conditions in Mexico.

"Cement manufacturers in Mexico, in association with carriers, have started a campaign to obtain an increase in the import duty now assessed on this commodity. As you undoubtedly know, there are five cement manufacturing plants in Mexico, with a potential production of 300,000 tons per year. The contention is that cost of production, together with transportation charges from the plants to coast or border points, puts Mexican cement in an unfavorable position as compared with the foreign product, and that cement used at points along the coasts and border line is of foreign manufacture. The railways are fostering the move, claiming that the sale in Mexico of foreign cement takes away from them the business from the Mexican cement plants to coast and border points. The consumption of foreign cements in Mexico is figured at about 30,000 tons per year, and the present import duty amounts to 1 cent Mexican currency per kilo, or about ¼ cent United States currency per pound.

"Our tentative opinion in this matter would be that the decrease in business of the Mexican cement manufacturers is not mainly due to foreign competition, but to the decrease in domestic demand, as together with the reduction in sales of Mexican manufacturers, a reduction in imports may be observed.

Tariff Will Decrease Use of American Cement

"In any event, if the tariff on cement in Mexico is raised, American manufacturers of this product will suffer, and naturally the price of cement in Mexico will increase.

"We are today addressing some of the leading cement manufacturers in the United States who export their product to Mexico asking for their views in the premises and offering the services of our chamber in case they think we can be of any assistance in protecting their interests.

"We shall consider it a favor if you will kindly furnish us with your valued opinion in connection with this matter, also if consistent, obtain the opinion of your members in this line of business, including manufacturers and exporters."

The Mexican Chamber of Commerce of the United States, Inc., will be pleased to hear from American manufacturers or exporters of cement who desire to get in touch with them in connection with the cement situation in that country. Communications should be forwarded direct to the Mexican Chamber of Commerce of the United States, Inc., 233 Broadway.

And Another Woodville Lime Plant!

THERE seems to be a lot of faith in the future of the Ohio finishing hydrate industry. Toledo newspapers of January 20 and 21 contain the following news item:

"Word was received here recently of the incorporation of a lime company at Woodville to be known as the Bruns Hydrated Lime Co., capitalized at \$450,000.

"J. W. Bruns, Woodville; R. L. Siegenthaler, Fremont; W. H. Young, A. W. Shields and M. C. Matheson, of Toledo, are incorporators.

"The company has secured 135 acres of stone land on the ridge just south of Woodville and adjacent to the plant of the Ohio Hydrate and Supply Co., which is owned by Woodville capital.

"The new plant will be located on the Pennsylvania railroad.

"It is understood that the financial structure of the new corporation will include 2000 shares of 8 per cent preferred stock and 2500 shares of common stock, each of a par value of \$100.

"This will give Woodville its fourth large plant, there being in addition to the Ohio Hydrate and Supply Co. the Woodville Lime Products Co., of Toledo, and the Washington Building Lime Co., owned by outside capital.

"A contract for a new lime plant to cost \$200,000 has been awarded by the Bruns Hydrated Lime Co. recently incorporated with a capital of \$450,000 to H. Miscampbell, Duluth, Minn.

"The company is entirely financed. Officers are: President, J. W. Bruns of Woodville; vice-president, W. H. Young, Toledo; secretary and counsel, A. W. Shields, Toledo; directors, the officers and F. E. Siegenthaler, Fremont; S. W. Jameson of Duluth.

California "Agstone" Plant Uses Rolls for Crushing

THE work of getting the plant of the Lakeside Lime Co. for the production of carbonate of lime for agricultural and other purposes into shape for quantity production is going forward steadily at the Eucalyptus ranch. It involves the construction of buildings, the building of roads to the quarries, and the installation of additional machinery.

Large bins for storing the lime and also for the crushed granite that will be a by-product of the plant are being erected at an elevation above the mill so that the products can be loaded into trucks. The necessary buildings for the installation of elevators and a complete screening system are being erected.

The mill that was put in first was not satisfactory and an entirely different system is now being tried, that of crushing the product between heavy steel rolls and running it through screens afterwards. So

far as tried this plan appears to be a satisfactory one. By the screening nearly all the foreign substances are removed from the lime and its analysis is rendered 6 or 8 per cent higher. If, after a more complete test, the roll crushing method is found to be the best larger rolls will be put in. The daily capacity of the plant will then be increased from 30 to 40 tons. The screens now being installed have that capacity.

The crushed granite is used for making roofing and is also sold for chicken grits.

A. C. Bellows, who is in charge of the entire project, said recently that he expected to have the plant in readiness for business within about a week.—*Lakeside, Calif., Journal.*

Big Blast Starts Operations at Graham Bros. Catalina Island Plant

WILLIAM WRIGLEY, JR., recently gave a section of his beautiful Santa Catalina Island to the cause of home building in southern California. His hand did not tremble when he threw a switch which exploded 18 tons of dynamite in one of the picturesque hills overlooking Pebbly Beach, to yield rock which a Long Beach firm, Graham Bros., Inc., will crush into building material. After the blast, which shook the island like an earthquake, the huge crushers in the half million dollar plant began to work for the first time.

While Mr. Wrigley and officials of the Graham Bros., Inc., and the Wilmington Transportation Co. stood on a hillside a quarter of a mile away, city and county officials watched from the decks of a glass bottom boat off the beach. A blast from the whistle of the steam shovel and the signal from Paul Graham that all was clear, and the owner of the island with the nonchalance of a boy exploding a tiny firecracker, exploded the largest amount of dynamite ever detonated at once in southern California.

Few realize the extent of the critical shortage of building rock which the people of Long Beach, San Pedro, Wilmington and other cities have been facing. Practically the only rock available was that scooped up from the beach near the plant. Now the new Graham Bros. plant will turn out as high as 5000 tons of rock per day for the builders and street contractors of southern California. The plant will, for the first few weeks, turn out 1200 tons per day and work 30 men, while tugs will pull five lighters laden with rock across the channel to the Long Beach harbor.—*Long Beach, Calif., Sun.*

[A "progress story" of this spectacular crushing plant and quarry operation was published in the November 3 issue of ROCK PRODUCTS. A full description of the operation is to be published in the near future.—Ed.]

Midwest Plant Rushing Work on Rebuilding Plant

WITH plans for rebuilding and re-equipping the Midwest Crushed Stone Quarries Co. of Greencastle, Ind., which recently burned, well under way, and with preliminary work already started, May 1 has been set as the time for the starting of the new plant.

Much steel will be used in building the new plant and it will be electrically equipped throughout. When completed the new plant will be much more complete and advantageously equipped than before the disastrous fire.

Work will be rushed in order to get the crusher house erected and the machinery installed in time to be ready for the spring demand for crushed stone for road building and other construction work. E. B. Taylor is superintendent.

New Gypsum Plant for Los Angeles

FOR the purpose of erecting a gigantic salt, gypsum and chemical mill near Ludlow to represent an investment of approximately \$2,000,000, the American Salt & Chemical Co., composed of local business men, has just been organized in Los Angeles.

The new corporation is capitalized at \$2,000,000 and its officials are Harry D. Standley, William M. Morse, Jr., Wendell S. Mills, T. W. Hindmarsh and Harry K. Sargent.—*Los Angeles, Calif., Examiner.*

Dolomite Products Company to Build Enlarged Plant

DOLOMITE PRODUCTS CO., of Cleveland, will rebuild and enlarge its crushing plant at Maple Grove, Ohio.

The present plant has a daily capacity of 2500 tons, and this will be increased to 4000 tons. The new plant will be steel and concrete construction and the layout will be such that a maximum efficiency will be secured with a low cost of production.

Carleton E. Nordale, consulting engineer, 332 South Michigan avenue, Chicago, has secured the contract for the rebuilding of the plant.

Phosphate Rock Reported in West Texas

PROMINENT business men of Alpine, Texas, state that surface indications point to an unlimited quantity of phosphate rock in this section.

If an investigation proves that phosphate of lime rock exists in Brewster county in sufficient quantities to supply an acid phosphate factory, the transportation facilities are excellent to transport the raw product to a factory in El Paso, where a market would be found in the irrigated lands of the Rio Grande valley.

Getting the Most Out of a No. 8 Crushing Plant

Granite Rock Company, Watsonville, Calif., Believed to Hold a Record for Economical Production—Parallel Units and Crusher Feeds Are Features

SHOOTING down stone on a quarry face 180 ft. high by merely toe-holing or "snake-holing" the base of the slope and using moderate-sized blasts of 40 per cent Trojan dynamite is the achievement of the Granite Rock Co., Watsonville, Calif., of which W. R. Wilson, a director of the National Crushed Stone Association, is the vice-president and general manager. Taking into account this very light drilling and powder cost, 180-ft. working face, in an arc 3000 ft. long, the fact that Mr. Wilson pushes 2000 tons of stone through a No. 8 and a No. 7½ crusher per day, one can appreciate that he has an unusually economical operation.

The rock is a tough, dark colored granite, but has been considerably shaken up at one time and another and comes down comparatively easily, as granite deposits go. The fault line of the San Francisco earthquake

of 1906 passed through one end of the face of this quarry; and probably the deposit had been similarly disturbed in times past.

The bluff or cliff containing the quarry rises abruptly from the valley of the Benito river, along the bank of which are the main tracks of the Coast Lines, of the Southern Pacific railway. The crushing plant is

erected on the side hill above the tracks and the quarry floor is nearly 100 ft. above the tracks.

On top of the granite deposit is 25 to 45 ft. of sand, clay and adobe. To strip this material water is pumped from the river by means of a 7x10 triplex Deane mine pump through a 4-in. steel main under 300-lb. pressure, to the top of the mountain, a total elevation of over 300 ft.

The water is delivered to a 3-in. hydraulic monitor and the spoil washed into natural flumes in the rock surface to canyons, or pockets in the hills back of the quarry. The water drained from these silt deposits is returned to the river, after being used for irrigation, when needed; and these made-lands from the stripping are good for agricultural purposes.

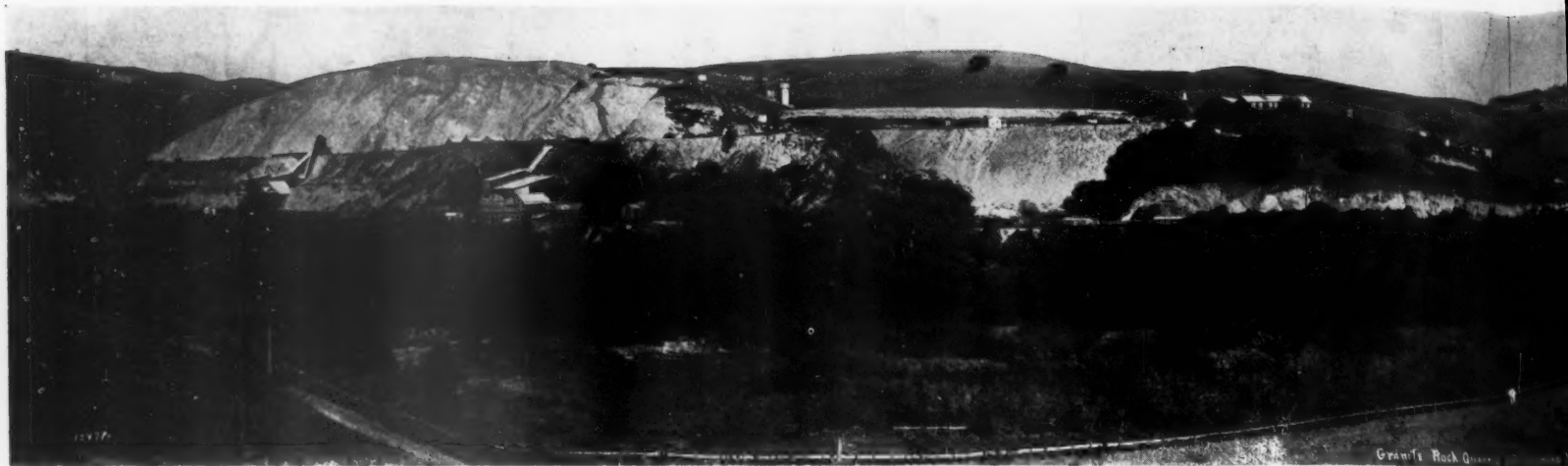
Three men, one nozzleman and two helpers with picks and



Close-up of monitor and operator



Hydraulic stripping looks easy but really requires skill and a knowledge of the ground. The figures given in the text show that the removal of dirt by the water in the operation described is very efficient



Panorama of Granite Rock Co.'s workings and surrounding territory. The working face is at the left. The white streak above the dump at the quarry face just above the trees. (This is an old view and within the last two or three years the plants have been removed.)



Steam shovel loading cars on the elevated track



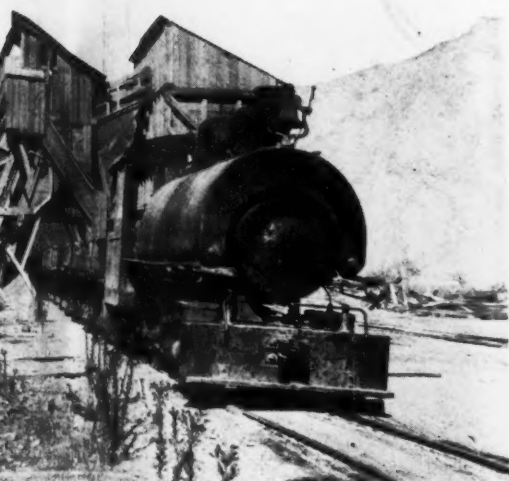
Rock train dumping to chute. The elevator is spoiled in the foreground.



The working face is 180 ft. high and swings in an arc 3000 ft. long. The fault of the San Francisco earthquake is visible in the foreground.



the dump at the right of the working face is made ground resulting from the hydraulic stripping operations. Two plants may be seen below
 (The plants have been combined as the later views show.) This dark belt of trees is made up of apple orchards



chute. The elevator brings back waste to be
 spoiled in the quarry



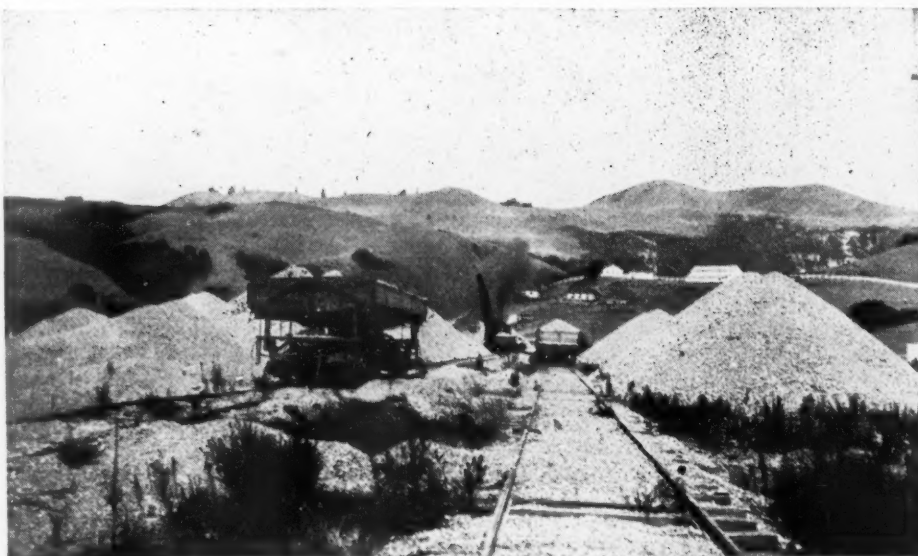
Plant on the main line of the Southern Pacific



San Francisco earthquake of 1906 passes through it, near the left end, and there are evidences of other seismic disturbances

shovels to break up the clods move and dispose of 100 cu. yd. of overburden per 8-hr. day. Owing to the very high quarry face the stripping cost per unit of rock produced is abnormally low. For the benefit of others who are contemplating hydraulic-stripping Mr. Wilson submits the following data in regard to the volume of water required:

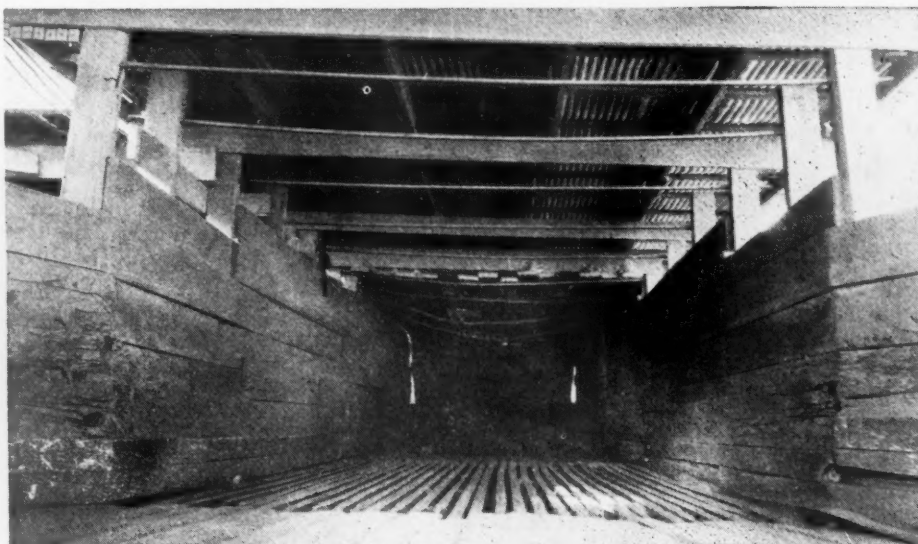
"Tests made upon the amount of washed material carried by the hydraulic stream show a maximum of 42.7 per cent by volume and 63.9 per cent by weight and a minimum of 13.3 per cent by volume and 23.9 per cent by weight. The higher values were obtained when washing sand and adobe and do not include the large quantity of rounded adobe clods carried down in the stream. The lower values were for extremely hard clay and adobe. These tests are merely an indication of what has been done under very good and very bad conditions and as comparatively few tests have



Rock storage which is about 2000 ft. below the plant on the railroad



Special steel bars used for lining chutes

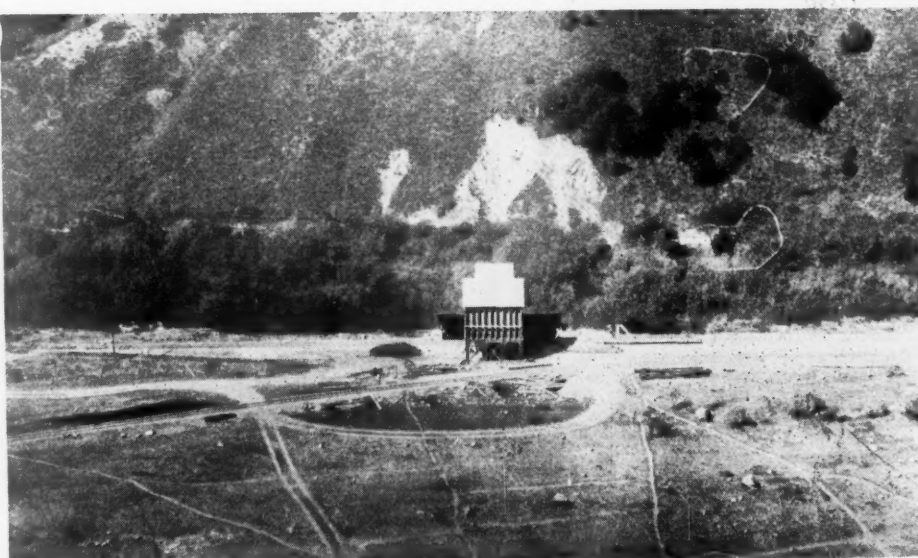


Looking down one of the chutes from the quarry to the plant

been made, an average value for the carrying power of the stream cannot be definitely determined. However, we believe that under average working conditions the material carried will run from 20 per cent to 30 per cent by volume."

As already noted, no drilling on the top of the exposed rock is necessary. Air-operated drills are used to toe-hole or snake hole the base of the quarry face to a depth of about 24 ft. These holes are sprung so that each hole is capable of receiving a charge of from 5 to 8 boxes of 40 per cent Trojan powder. Several holes are shot simultaneously.

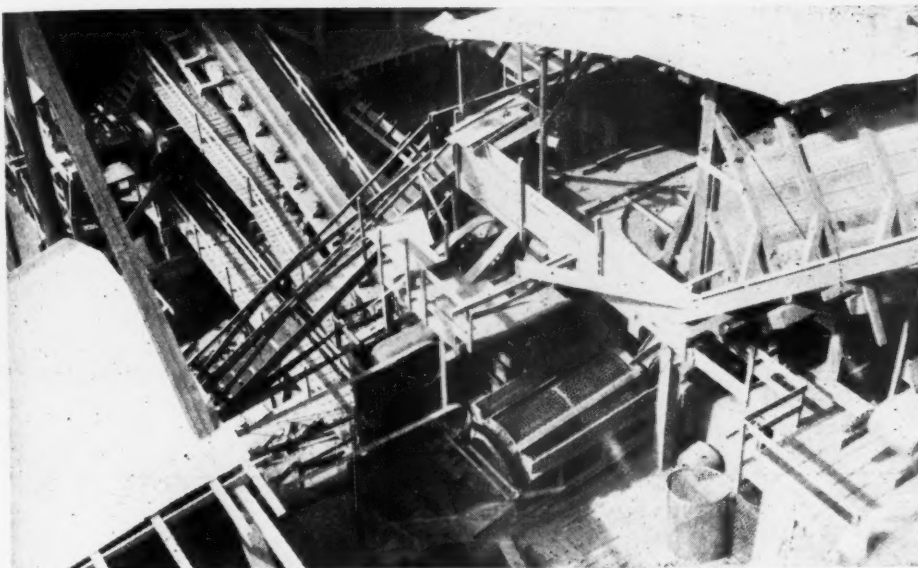
This shakes down the whole face in sizes that can generally be handled by a Model 50 Marion steam shovel with little additional blasting. The peculiar method of placing the quarry railway tracks on an embankment, illustrated herewith, and its advantages are described in the "Hints and Helps" section of this issue.



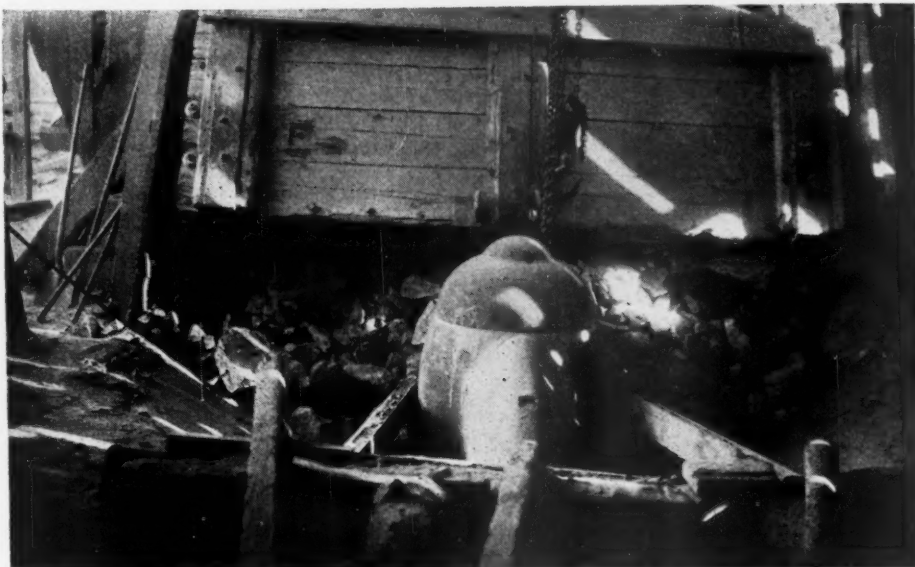
Looking down on the upper part of the plant and quarry floor from top of the working face



The pole dumper. As the car is pulled forward the pole becomes vertical and dumps the car



Looking down on the upper part of the screening system

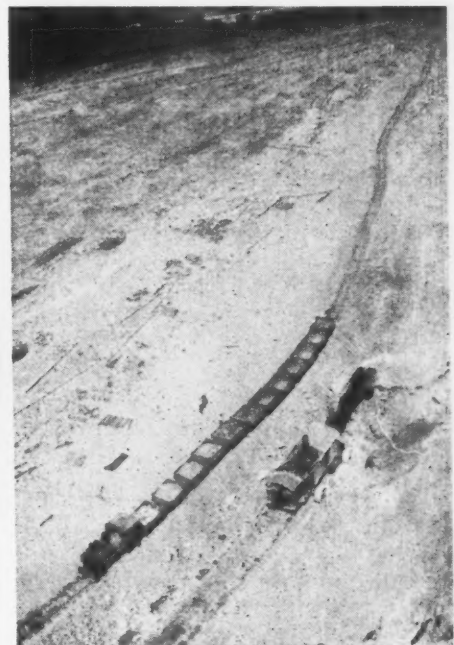


Oak doors or "Rap valves" which feed the rock crusher with the rock in the chutes as fast as the crusher will take it

Trains of twelve 4-cu. yd. Western dump cars drawn by 15-ton Porter steam locomotives take the stone to the crushing plant. A pole dumper is used to dump the cars as they pass the entrance of the chutes feeding the crushers.

The crushing plant is peculiar from the fact that it consists of two parallel units, practically alike, either one of which may be operated, or both simultaneously. They are indeed two separate and distinct plants in nearly all essential details and were, as the panoramic view of the quarry shows, originally separated by several hundred feet.

The No. 7½ plant was dismantled and erected alongside the No. 8 plant and cross-connected as the flow sheet shows, to be operated as a single unit. The idea of two or more parallel crushing and screening units only one of which need be operated if the demand is low, is one which has been



Rock train photographed from top of quarry face

much used in the most modern copper-mine mills of the West. This is the first quarry plant designed in this manner that the editors have yet found. Either plant has an approximate capacity of about 1000 tons per 10-hr. day, or a total capacity of from 1800 to 2000 tons.

The advantages of parallel units become obvious upon a little consideration. It is not economical to operate a single 2000-ton-a-day unit on a production of 1000 tons a day, as every quarry man knows. The quarry cost, power costs and the wear and tear and depreciation are practically the same in either case. With separate units, as in this case, by the elimination of the train crews, the power costs and half the plant labor, a 1000-ton output costs very little more per ton than a 2000-ton output.

Crusher salesmen have told Mr. Wilson that he gets more stone through his No. 8

and No. 7½ crushers (McCully) than passes through the same sized crushers anywhere else. The reason for this is that these crushers are never running idle—they are always crushing stone. This 100 per cent utilization of their running time is made possible by the long side-hill feeding chutes.

Quarry rock is fed out of these chutes through great oak doors, or "flap valves" at the crusher, as fast as the crusher can absorb it. As the chutes are large enough to hold two or three train loads of rock, the operation can be readily planned so that the crushers are never idle. Two quarry trains operating between the shovel and each crushing unit will under ordinary conditions keep the chutes supplied with all the stone

is generally credited with having designed a plant of exceptional simplicity with a maximum amount of production for a minimum of equipment and labor.



The plant and inclined chutes. The elevator is to bring the waste to the quarry level as there is no room to spoil it in the narrow canyon below

and more attention as the demand for constantly cleaner materials grows.

The main problem of this operation at present is to provide for a large initial jaw crusher installation to take care of pieces of rock beyond the present capacity of his No. 8 crusher. The placing of this new initial crusher ahead of the chutes on the quarry floor is complicated by his present scheme for disposing of waste material, and by the fact that a sacrifice of too much headroom above his No. 8 and No. 7½ crushers would remove the great advantage of ample storage above these crushers.

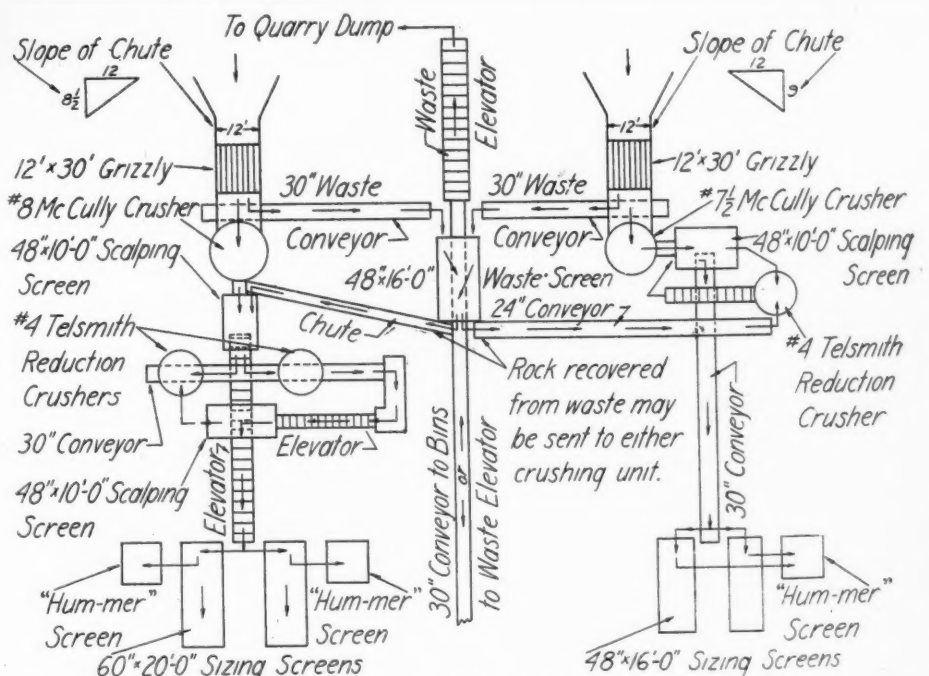
This plant supplies a large amount of

The manner in which he has prevented contamination of his commercial stone by the waste and fines in his quarry is particularly interesting. This is a feature in crushing plant operation that is receiving more

the crushers can take care of; and the storage of stone ahead of the primary crushers provides for ordinary delays in shovel work and transportation.

The chutes are lined with 3x3 T-bars rolled from a special .40 per cent carbon steel. In the lower parts of the chutes are bar grizzlies 12x30 ft. with 2-in. spacing between the bars. The material passing these grizzlies is removed by special belt conveyors to a 48-in. by 16-ft. screen from which the rock (¾-in. and over) is recovered and the fines wasted. The fines go to a belt and bucket elevator and are transferred to bin on the quarry floor and wasted in the quarry; or they are taken by belt conveyors to track-loading bins on the S. P. tracks—there being a call for fines for railway filling, and similar purposes, at times.

The flow sheet of the plant is shown on this page and gives all the details of the crushing and screening units. A study of this flow sheet is well worth the time of any crushing plant operator, for Mr. Wilson



Note: Waste conveyor may run either way, taking waste to storage bins or back to quarry level where it is hauled to the dump.

Flow sheets of the two crushing plants

ballast for the Southern Pacific Coast Lines and large quantities of stone for highway and commercial purposes. Owing to the fact that there are quarries near the waterfront of San Francisco Bay, it does not reach the big city markets with any large quantities. The quarry is at Logan, 93.1 miles south of San Francisco.



Steam shovel in quarry. Note that the too large pieces are side cast to form part of the embankment on which the track is placed

A. R. Wilson, vice-president and general manager of the company is a well-known highway contractor in addition to being one of the pioneer quarrymen of the Coast. He

is a native son of California and a civil engineering graduate of the Massachusetts Institute of Technology. His son, A. J. Wilson, a recent graduate of Tech is now with the operating department of the company.

Charles F. Langley is president of the Granite Rock Co.; Charles E. Bloom, secretary and treasurer and John E. Porter, sales manager. W. J. Willinson is superintendent. Watsonville is in the heart of one of the greatest apple and fruit belts in the world and every workman has a neat little home and all the trimmings. Mr. Wilson has no labor shortage or labor troubles.

Rock Characteristics and Blasting

IN the first place, the fundamental geological conditions of utmost importance, yet often at least partially ignored, must be fully considered. Many thousands of dollars were lost not long ago by a contractor in northern New York, whose previous experiences had been confined to the shales and sandstones of Pennsylvania. When estimating the cost of excavating granite he made allowance for increased drilling cost, due to its hardness and toughness; but he failed to consider the fact that the absence of lines of stratification would require drill holes much closer together than in shale. The result was that not only the drilling cost but the cost of explosives per cubic yard was almost double what he had estimated.

There are the two great classes of rock—sedimentary and igneous. These rocks vary greatly in hardness—from talc, gypsum, and calcite, on up to the diamond. Moreover, these rocks vary in toughness as well. Sandstone, for example, is hard; many igneous rocks are often exceedingly tough, and will stand a heavy blow without splintering; and some rocks, like trap, are both hard and tough. In the table of relative

toughness, for example, rating limestone as 1, slate ranks 1.2, granite 1.5, basalt 2.3, sandstone 2.6. From this it is evident that the same kind of a blow which would break a soft rock into pieces would not even crack a harder and tougher rock. So, of course, to break these different kinds of rock, blows of different kinds are needed. Besides, these rocks have not only many degrees of hardness and toughness but different weights also; and quite naturally the energy it takes to move soft coal, weighing (roughly) from 2000 to 2500 lb. per cubic yard, will be considerably less than that required to move gypsum weighing 3900 lb., or shale weighing 4500 lb.—Douglas P. Allison in *Engineering and Mining Journal*.

Asphalt Brick to Be Made of Local Material in Oklahoma

ADA, Okla., is to have a new industry, the making of asphalt paving brick from rock asphalt quarried near by. The quarry was developed by A. Steinberger of Tulsa, Okla., who will sell his output to paving brick manufacturers.

Three miles of railroad are to be built at once to connect the quarry with the Frisco road. The quarry has a number of unfilled orders on hand and may begin shipping before the railroad is ready.

New Stucco Plant for Los Angeles

THE Bishopric Stucco Co. of Cincinnati is building a \$50,000 plant on a site 228x500 on South Park avenue, at the corner of Sixty-second street, Los Angeles.

It will exceed the size of the parent plant by 25 per cent and will be decidedly larger than the factory in Ottawa, Canada.

Plans indicate it will be one of the largest and best equipped stucco and stucco-board plants in the United States.

New Phosphate Plant Progressing

THE Nashville, Tenn., papers report that work on the new plant of the Tennessee-Illinois Phosphate Co. is progressing rapidly and that the retail trade of the whole territory has felt the stimulation of renewed activity in the phosphate mining section of the state.

American Concrete Institute

THE American Concrete Institute will celebrate its 20th anniversary when it holds its meeting in Chicago February 25-28. A program of interest to cement and aggregate producers as well as makers of concrete has been prepared.



Made ground resulting from hydraulic stripping, which is valuable for agricultural purposes

Traffic and Transportation

By EDWIN BROOKER, Consulting Transportation and Traffic Expert,
Munsey Building, Washington, D. C.

Proposed Changes in Rates

THE following are the latest proposed changes in freight rates up to the week beginning February 4:

Central Freight Association

7834. Stone, crushed, rough (not dimension or dressed), rubble, rip rap and quarry strippings. Lehigh, Ill., to Clarks Hill, Colfax and Lebanon, Ind. Present, 6th class basis; proposed, \$1.01 per net ton.

7835. Crushed stone. Buffalo, N. Y., to Jamestown, N. Y. Present, 13½ cents; proposed, \$1 per net ton.

7837. Gravel and sand (other than blast, engine, foundry, glass, molding or silica sand). Rupel and Ginger Hill, Ind., to Shipshewana, Middlebury and La Grange, Ind. Present, 6th class; proposed, 80 cents to Shipshewana and Middlebury, Ind., and 88 cents per net ton to La Grange.

7829. Slag (cupola). South Bend, Ind., to Chicago, Ill. Present, 15 cents; proposed, \$1.01 per net ton.

7843. Sand and gravel. Deeter, Ind., to Middlebury and Shipshewana, Ind. Present, 87 cents net ton to Middlebury and 6th class to Shipshewana; proposed, 80 cents net ton.

7844. Crushed stone. Harrisville, Branchton and Osbornes, Pa., to Mather, Pa. Present, 6th class; proposed, \$1.60 per net ton.

6713. (Sup.1) Lime, calcium, viz: Chloride of lime. L. C. L., Belle, W. Va., to east of Western Termini of Eastern Trunk Lines. Present, classification basis; proposed, same commodity rates as published in Item 2615 A of C. F. A. L. Trf. 218B on caustic soda, L.C.L.

7859. Crushed stone and screenings. Rock Point, Pa., to Pulaski, West Middlesex, Farrell and Sharon, Pa. Present, \$1.05 per net ton; proposed, 90 cents per net ton.

7863. Crushed stone. White Sulphur, Ohio, to stations on the Northern Ohio Ry. Present, 6th class; proposed, to Carey, Sycamore, Plankton and Lykens, \$1; and to Chatfield, New Washington, North Auburn, Plymouth, Greenwich, New London, Spencer, Litchfield, Medina, Bonita, Sharon Center, Copley, Schoclog Road, Fairlawn, Hawkins, Portage Path, Merriman and Akron, 90 cents per net ton.

7884. Crushed stone. Fultonham, Ohio, to Ohio. Present and proposed per net ton:

To	Present	Proposed
Alliance, Ohio	\$1.20	\$1.10
Amanda, Ohio	.90	.80
Amsterdam, Ohio	1.40	1.10
Bellaire, Ohio	1.40	1.00
Belpre, Ohio	1.20	1.00
Bridgeport, Ohio	1.40	1.00
Lore City, Ohio	1.10	.80
Cumberland, Ohio	1.30	1.10
Freeport, Ohio	1.40	1.20
McCunesville, Ohio	.80	.70
Coalton, Ohio		1.00
Glenroy, Ohio		1.00
Jackson, Ohio	1.40	1.00
Monroe, Ohio	1.50	1.10
Toronto, Ohio	1.50	1.10

In addition it is proposed to reduce rates to the following points on account of the proposed rates to the intermediate points being lower:

To Senecaville, intermediate to Cumberland, present, \$1.30; proposed to point intermediate, \$1.10.

To Blue Bell, intermediate to Cumberland, present, \$1.40; proposed to point intermediate, \$1.10.

To Neffs, intermediate to Bellaire, present, \$1.40; proposed to point intermediate, \$1.

To McLroy, intermediate to McCunesville, present, 80 cents; proposed to point intermediate, 70 cents.

To Bristol, intermediate to McCunesville, present, 80 cents; proposed to point intermediate, 70 cents.

To Dundas, intermediate to Glenroy, present, \$1.10; proposed to point intermediate, \$1.

To Oak Hill, intermediate to Monroe, present, \$1.20; proposed to point intermediate, \$1.10.

To Black Fork, intermediate to Monroe, present, \$1.20; proposed to point intermediate, \$1.10.

To Jackson, intermediate to Monroe, present, \$1.20; proposed to point intermediate, \$1.10.

To St. Clairsville, intermediate to Freeport,

present, \$1.40; proposed to point intermediate, \$1.20.

7892. Agricultural lime. Akron and Barberton, Ohio, to east of Western Termini of Eastern Trunk Lines. Present, on basis of 25½ cents per hundredweight to New York Item 1665A, Agent Jones Trf. 218B; proposed, to add Akron and Barberton, Ohio, as points of origin in Item 1465 of C. F. A. L. Trf. 130-O, which names a basis of 70 per cent of 6th class, minimum weight 36,000 lb., to C. F. A. territory.

Illinois Freight Association

1927B. Gravel. Carloads, minimum weight, 90 per cent of marked capacity of car, 88 cents per net ton from Cairo, Ill., to Eldorado, Ill.

2316. Glass furnace slag. Carloads, minimum weight 80,000 lb., 16 cents per 100 lb., from Crystal City, Mo., to Chicago, Ill. (Inf. Jan.)

2318. Sand and gravel. Carloads, minimum weight capacity of car, \$1.26 per net ton from Metropolis, Ill., to Merriman, Ill. (M.R.P. 285)

2320. Stone, sand and gravel. Carloads, minimum weight marked capacity of car, \$1.89 per net ton from Joliet, Ill., district to Taylor Ridge, Ill., on R.I.S. Ry.

2321. Stone, natural, viz: Broken, ground, rip rap, dust, chip and rubble. Proposal to amend tariffs publishing commodity rates on crushed stone between points in I.C.R. territory to include aforementioned commodities at same rates and minimum weights as currently applicable on crushed stone, carloads.

2324. Sand and gravel. Carloads, minimum weight 90 per cent of marked capacity of car, 76 cents per net ton from Moronts, Ill., and 80 cents from Chillicothe, Ill., to LaSalle, Ill.

2325. Sand and gravel. Carloads, proposal to cancel proportional rates from Kankakee, Ill., to I. C. R. stations as follows: Peotone to Ottowa, Ill., inclusive, 63 cents; Chebanse to Paxton, Ill., inclusive, 76 cents; Ludlow to Champaign, Ill., inclusive, 84 cents; Irwin to Buckingham, Ill., inclusive, 76 cents; Cabery to Chatsworth, Ill., inclusive, 84 cents, and to apply in lieu thereof distance tariff rates.

New England Freight Association

5841. Limestone, ground, unburned or broken, and chalk, prepared, or whitening, ground or lump. From Boston, Brighton, Cambridge, Cambridgeport, Chelsea, East Boston, East Cambridge and Everett, Mass., to Worcester, Mass., limestone 7 cents, chalk or whitening 12½ cents. Reason: To meet Boston & Maine R.R.

5853. Molding sand. From Elnora, Reynolds, Schaghticoke, Schuylerville, Scotia, Saratoga Springs, Stillwater, Wayville, Ushers, N. Y., to Harlem River, N. Y., 16 cents. Reason: To encourage and permit movement of traffic.

Southern Freight Association

12461. Cement. Carloads, from Kingsport, Tenn., Winchester, Ky., and following local stations on the C. & O. Ry.: Cincinnati Division: Russell, Ky., to K. C. Junction, Ky., except Manchester, Ripley and New Richmond, Ohio; Kentucky Division: Lexington District, Mount Savage, Ky., to and including Netherland, Ky. Present, 15½ cents per 100 lb. Proposed, 17 cents per 100 lb., same as rates were originally established. However, when rates to Cincinnati and Lexington were revised, through oversight the rates to destinations in question were not correspondingly changed.

12507. Crushed stone. Carloads, from Ripplemead, Pembroke and Blue Ridge, Va., to Winston-Salem, N. C., and intermediate N. & W. Ry. stations north thereof. Present and proposed rates: From Blue Ridge, present, \$1.40; proposed, \$1.26; from Pembroke and Ripplemead, present, \$1.50, proposed, \$1.44 per net ton. Proposed rates to Winston-Salem are based on the proposed Georgia-Alabama scale, such rates to be applied as maxima to intermediate destinations.

12517. Gravel. Carloads, from Collong, S. C., to Laurinburg, N. C. Present, \$1.49 per net ton (combination); proposed, 99 cents per net ton, made on basis of joint haul scale submitted by carriers to Georgia Public Service Commission for application over trunk lines.

12549. Cement. Carloads, from Nashville, Tenn., to all points in Georgia (except Columbus), and Florida (except River Junction and points west thereof), to which no through commodity rates are now published; also to Charleston, Beaufort and Port Royal, S. C. Sixth class rates now

apply. Proposed, 4 cents per 100 lb. higher than existing rates from Richard City, Tenn., as published in Agt. Glenn's I.C.C. A455.

12563. Gravel, Carloads, from Sulligent, Ala., to New Albany, Miss., and intermediate points on St. L.-S. F. Railway north of Tupelo, Miss. Present, to New Albany, 99 cents per net ton, with rates to intermediate points subject to New Albany rate under Rule 77. Proposed, 90 cents per net ton, made in line, distance considered, with present rate from Iuka, Miss.

Southwestern Freight Bureau

48. Molding sand. To establish rate of 22½ cents per 100 lb. on molding sand, carload minimum weight marked capacity of car, from Ottawa and Utica, Ill., to Muskogee, Okla., in order to place rate to Muskogee on a parity with rate in effect to Tulsa, Okla.

51. Cement, portland, etc. To establish the following rates in cents per 100 lb., from territories named below on cements, portland, etc., as described in Item 2530E. S.W.L. Trf. 15L to Gate, Knowles, Mocane, Forgan, and Beaver, Okla.: From St. Louis, 38½ cents; Peoria, 42 cents; Chicago, 45 cents; Minneapolis and St. Paul, 46½ cents. These rates are now in effect to Rosston, Okla., and shippers claim that on account of their locality the points named are entitled to same rates as Rosston.

53. Stone, rough. To establish the following rates in cents per 100 lb. on rough stone on all kinds; paving blocks; curbing; in straight or mixed carloads, minimum weight marked capacity of car, from Ft. Logan H. Roots, Little Rock and North Little Rock, Ark.: To E. St. Louis, Ill., 17 cents; St. Louis, Mo., 17 cents; Chicago, Ill., 20½ cents; Cincinnati, Ohio, 16½ cents; Louisville, Ky., 16½ cents; Memphis Tenn., 8½ cents. The proposed rates are now in effect via one line and it is desired to make them effective via all lines.

Trunk Line Association

11839. Limestone, ground, precipitated or pulverized, and limestone dust. Carloads, minimum weight, 50,000 lb. From Munns, Valley Mills and Oriskany Falls, N. Y., to Franklin, New York, Youngs, South Unadilla, Sidney, New Berlin Junction, Rockdale, N. Y., 5½ cents; and Kingston, N. Y., 9½ cents per 100 lb.

11843. Rough stone. Carloads, minimum weight 90 per cent of marked capacity of car; except when car is loaded to cubical or visible capacity actual weight will apply. Wilmington, Del., to Philadelphia, Pa., \$1.39 per 2000 lb. Also cancel existing commodity rate from Wooddale, Del., account being obsolete.

11844. Ground limestone. Carloads, minimum weight 50,000 lb., from Thomasville, Pa.-Cavetown, Md., districts to Mabie, W. Va., 16 cents per 100 lb.

Transcontinental Freight Bureau

4484. Sand, silica. As described in Item 3955 of Trf. 4T (I.C.C. 24, 1471, A114, 1130, N. W. Hawkes, B. T. Jones, H. Wilson and R. H. Countiss, Agents, respectively), carloads, W. B. Proposed to reduce the rate from 50 to 40 cents per 100 lb. to meet competition with shipments from Belgium.

4500. Gravel, in mixed carloads, with baked and pulverized clay or sand. W. B. Request that Item 4710 of Trfs. 1W (I.C.C. 23, A116, 1476, 1129, N. W. Hawkes, H. Wilson, B. T. Jones and R. H. Countiss, Agents, respectively), applying on baked and pulverized clay or sand, be amended, to apply on gravel for use with clarifying clay or sand when in mixed carloads therewith.

Western Trunk Line

3633. Stone. Carloads, minimum weight 90 per cent of the marked capacity of car except that when weight of shipment, when loaded to full visible capacity of car, is less than 90 per cent of marked capacity of car the actual weight will apply, but in no case shall the minimum carload weight be less than 40,000 lb. Present rates and description. Sioux Falls, S. D., to Soo City and Rock Rapids, Iowa. Stone (building and monumental, except carved, lettered, polished or traced). Granite or stone curling and paving blocks, 7 cents. Stone (other than above), 5½ cents. Proposed rates and description: Sioux Falls, S. D., to Sioux City and Rock Rapids, Iowa. Stone, sawed more than four (4) sides,

dressed, chiseled, hammered, sand-rubbed, sawed flagging or curbing, not figured, lettered or polished. Present, 7 cents; proposed, 10 cents. Stone, sawed four (4) sides and less, rough undressed stone, paving stone, not figured, lettered or polished. Present, 7 cents; proposed, no change. Stone (crushed, rip rap or rubble). Present, 5½ cents; proposed, no change. Sioux City, Iowa, to Sioux Falls, S. D. Stone, sawed more than four (4) sides, dressed, chiseled, hammered, sand-rubbed, sawed flagging or curbing, not figured, lettered or polished. Present, 12 cents; proposed, 10 cents.

2051B. Stone (broken, crushed, ground and fluxing), carloads, from New Ulm, Minn., to stations in Iowa. Present and proposed rates to a few representative points as follows:

To	Present	Proposed
Griswold		\$0.10
Iowa City	\$0.12	.10
Iowa Falls	.08½	.08
LeMars	.07½	.07
Maquoketa		.10
Marshalltown	.08½	.08
Mason City	.07½	.07
Merrill	.07½	.07
Muscatine	.12	.11
Ottumwa		.11
Postville		.10½
Sioux City	.07½	.07
Storm Lake	.07½	.07
Webster City	.08½	.07½

Minimum weight, 90 per cent of marked capacity of car, but not less than 50,000 lb.

3664. Lime. Carloads, from Wisconsin producing points. To Kansas City, Mo. Present, 21 cents per 100 lb.; proposed, 22½ cents per 100 lb.

1590C. Lime, plaster, stucco and plasterboard in mixed carloads. From Blue Rapids and Irving, Kans., to points in W.T.L. territory. Present, Lime may be shipped in mixed carloads with plaster and/or stucco and/or plasterboard, provided the weight of the lime does not exceed 25 per cent of the weight of the entire shipment. Actual weight to apply on the lime contained in the car at rate of 3 cents per 100 lb. higher than the rate applicable on plaster. On the remainder of the carload, the current carload rates to apply on the actual weight. The entire carload to be subject to the minimum weight applicable on plaster, and if the actual weight of the entire carload is less than such minimum weight, the deficit will be charged for at the plaster, carload rate. Proposed: To authorize mixed shipments of lime, plaster, stucco and/or plasterboard at plaster rates.

2310B. Sand. Carloads, from Portage, Ill., to Cedar Falls, Iowa. Present, \$2.40 per ton of 2000 lb.; proposed, \$1.70 per ton of 2000 lb. minimum weight, capacity of car.

Freight Tariff Reduced

THE Spartanburg Quarries Corp., Spartanburg, S. C., can hereafter ship its products of crushed stone to points in North Carolina over the Seaboard Air Line railway at \$1.58 per ton, instead of the prohibitive rate of \$3 per ton, which has heretofore obtained, according to an announcement made recently by W. H. Hendley, traffic manager of the Spartanburg Transportation Association.

Sand and Gravel Rates

IN a report on No. 13365, Roquemore Gravel Co. v. Atlanta & West Point et al., opinion No. 8968, 85 I. C. C., 184-6, the commission found the rates on sand and gravel from Montgomery, Ala., to La Grange, Ga., unreasonable, awarded reparation and ordered the establishment of a rate of 90 cents per ton, not later than April 2. The rates alleged to be unreasonable were \$1.13 and \$1 on sand and gravel, respectively. The complaint asked for a rate of 90 cents and reparation to the basis of such a rate on shipments made on and after September 10, 1921. The 90-cent rate was requested before shipments were made. The commission found the rates unreasonable to the

extent that they exceeded \$1 per net ton prior to July 1, 1922, and 90 cents thereafter.

Silica Sand Rates

IN a report on No. 14055, Charles Boldt Glass Co. vs. Chicago, Burlington & Quincy et al., opinion No. 9001, 85 I. C. C. 412-15, the commission found rates on silica sand, from Ottawa, Ill., to Carrel street station, Cincinnati, unreasonable, awarded reparation and prescribed a rate not exceeding \$2.50 to be made effective not later than March 11. The rate charged was \$3.22 prior to July 1, 1922, and \$2.90 thereafter.

Through Rates Established for Land Plaster

THE public service commission announces the establishing of joint through rates, effective February 19, between Gypsum in eastern Oregon, on the Oregon Short Line and points on the Southern Pacific south of Portland, including Salem, Albany, Corvallis, Eugene and Roseburg, on carload shipments of wall plaster, land plaster and gypsum rock. Hitherto these commodities were shipped to Portland on a 16-cent rate plus the local rates from Portland south.

The new carload rate, for instance, on a 60,000-lb. car of land plaster to Eugene is now 26½ cents, a reduction of 7½ cents per 100 lb., or \$45 per car.

Reparation on Shipments

SOUTHERN PACIFIC CO. has been ordered by the commission to pay to the Pacific Portland Cement Co., Consolidated, reparation on all shipments of crude lime rock moved from Flint to Tolens during the "Federal Guaranty Period," March 1, 1920, to August 31, 1920, inclusive, that would have accrued on the basis of a rate of 60 cents a ton. Complainant alleged that it was required to pay a rate of 70 cents a ton from March 1, 1920, to and including August 25, 1920, and a rate of 90 cents a ton from August 26 to August 31, 1920, and that these rates were unjust and unreasonable and in violation of section 13 of the Public Utilities Act in so far as the rates exceeded 50 cents per ton.

Commissioner Brundige in a dissenting opinion stated that complainant has completely proved that it is entitled to reparation upon all shipments of rock moved at a rate in excess of 50 cents a ton from March 1, 1920, to and including August 25, 1920, and from August 26 to 31, 1920, inclusive, reparation should be made upon the basis of shipments made at a rate of excess of 60 cents per ton.—*San Francisco, Calif., Commercial News.*

DURING November 14,357,614 lb. of acetate of lime were produced in the United States, against 14,886,260 lb. in November, 1922.

Utah's Big Gypsum Quarry

UTAH claims the largest and purest deposits of rock gypsum in the world, from which is made perhaps the most famous plaster yet discovered. The state also boasts of one of the largest and best equipped plaster mills in the West, located at Nephi, near the immense gypsum quarry of the Nephi Plaster and Manufacturing Co.

Twenty-four years' work at the quarry on the side of the mountain of gypsum has only made a huge white scar on the side of the immense deposit which stands 700 ft. high. Thousands of tons are dislodged in a single blast and sent through the company's mill to be converted into hardwall plaster, land plaster, wood pulp plaster, superior finishing plaster, casting plaster for ornamental work, dental plaster and Nephi, Utah, Keene's cement. Land plaster is widely used as a fertilizer throughout the West and Northwest.

The state has two plaster plants, the second operating at Sigurd, Utah, on a smaller basis.

After careful test, Nephi plaster was chosen for the main group of the Panama-Pacific International Exposition. Palaces and all the statuary, the great majority of foreign and state buildings, including the state building of California, were constructed with Nephi plaster.

West Texas Potash

COLORADO, Texas, will watch with interest developments of the proposed bill to be introduced by Senator Shepard, providing for an extensive investigation of possible potash mining in West Texas by Congress. That potash underlies this county has been known here for some time and during the last two years much interest has centered about the possibility of developing the deposit on a commercial basis.

That potash existed in Mitchell county was discovered more than two years ago by Dr. Udden of the University of Texas, who examined specimens taken from some of the oil wells west of Colorado. He found the presence of potash in several different specimens analyzed, the ratio being 11.6 per cent of the part soluble in water.

The potash-bearing stratum which is found in practically every well drilled in the oil field is several feet in thickness and is from 900 to 1100 feet below the surface.—*Dallas, Texas, News.*

Selling Potash Stocks Instead of Oil Stocks

PENNSYLVANIA papers say that the registration of the Farmers Oil Co. of Lancaster, Pa., has been cancelled because it was selling potash stock instead of the oil stock which they were registered to offer.

Missouri Highway Commission Making Survey of Gravel

THE gravel inspection in Nodaway county is part of a state-wide campaign of the Highway Commission to locate highway construction materials in the state in order to ascertain the quantity and quality of material available for road work.

The gravel survey work in Nodaway county is being conducted by M. D. Hudson, engineer from the St. Joseph division office of the State Highway Department, and J. E. James, superintendent of road maintenance in this county.

The Belcher gravel pit, three miles northeast of Maryville, and another pit, two and three-quarters miles east of town, and the Heitman gravel pit, four and one-half miles southeast of here, were all inspected recently and samples of the different gravel found sent in to the state department at Jefferson City.

Recently, Mr. James and Mr. Hudson have inspected the pit, one and a half miles north of Wilcox, and the quantity and quality of this product were ascertained.

It will be a week or ten days before the samples are thoroughly tested and the results made known. Not only the quality but the quantity of the gravel available will be taken into consideration by the State Highway Department.

The locating of gravel pits in northwest Missouri does not necessarily mean that the primary road between Maryville and St. Joseph will be built of gravel, Mr. Hudson said. The gravel in this section of the state may be shipped to other parts where this type of material is not available for road work there.—*Marysville, Mo., Democrat.*

Committee Appointed to Make Cement Survey

THE Secretary of Commerce has appointed an advisory committee to make, under the general direction of the Department of Commerce, a comprehensive survey of the properties and uses of cement and concrete. The committee will co-operate with the Bureau of Standards and officials of the department.

This committee consists of: John Lyle Harrington, chairman, engineer, Kansas City, Mo.; C. H. Boynton, cement manufacturer, New York, N. Y.; N. Max Dunning, architect, Chicago, Ill.; H. C. Turner, contractor, New York, N. Y.; Charles M. Upham, highway engineer, Raleigh, N. C.

The cement industry has grown so rapidly and has achieved such great importance in the United States and the use of cement in the construction of roads, bridges and buildings has become so great and so diversified that the intelligent and appropriate use of this material becomes a matter of great economic interest to the public.

Research work is now being carried on by the Bureau of Standards and by various public and private research laboratories and commercial and professional organizations in the properties, characteristics and proper use of cement; in the improvement of methods, equipment and appliances tending toward improved efficiency and economy; the seasonal use of cement, especially in winter weather, important in its relation to continuity of employment of labor and the elimination of "peaks" and "depressions" and the spread of manufacture and distribution more evenly.

It is proposed through the survey to correlate for the benefit of the industry and the public the results of such scientific and technical activities and to center in and under the direction of the Department of Commerce a thorough and disinterested study of the entire subject. It is believed that such concentration of effort as the committee proposes to bring about will produce material results in the elimination of wasteful duplication of effort, and effect savings to the public and result in benefit to the manufacturer.

New Company to Handle Ada, Okla., Rock Asphalt

C. P. BENNETT, cotton man, with offices in Memphis, Tenn., and at Dallas, Texas, and associates have formed the Memphis-Ada Rock Asphalt Co., to handle, under a 20-year contract with the Ada Rock Asphalt Co., with general offices at Tulsa, Okla., the exclusive output of that company's mines in Tennessee, Mississippi, East Arkansas and East Louisiana.

This will give Memphis the headquarters for a company with ample capital to handle paving material produced from a mine near Ada, Okla., which is said to contain deposits of over 13,500,000 tons.

The Ada company is preparing to locate brick plants at various sections, to which the rock will be shipped from the mine.

Crescent Silica Co. Builds Big Warehouse

THE new \$60,000 sand storage plant of the Crescent Silica Co. is practically completed at the present time, and will be in use in two weeks, it was stated today. The plant is the largest of the kind in this part of the country and is constructed of concrete and steel. It is a big addition to the commercial life of Ottawa.

Peter Van Trigt, of Chicago, the construction engineer in charge of the erection of the plant, has completed his work here and returned to Chicago. He will leave in a few days with the members of his family for a three months' vacation trip to Holland.—*Ottawa, Ill., Journal.*

Big Rock and Gravel Company for Upland, Calif.

THE Standard Rock Crushing and Gravel Co., owned by Messrs. Kruce and Fuller, recently from Detroit, Mich., have just completed arrangements for the location of a huge plant on the property of the Mountain View Water Co. at Fourteenth street and the San Antonio wash, Upland, Calif. It is said that the investment will reach \$300,000.

The capacity of the proposed plant will be between 2000 and 6000 tons of rock a day. The plant is to be installed by M. Bland, an engineer recently from South Dakota, who is also to superintend its operation.

It is stated that the work of constructing the plant is to commence at once and that contracts for its entire output have already been entered into with a Los Angeles concern, which it will serve exclusively.

A spur track of the Pacific Electric railway will be extended directly west to the wash, affording the company shipping facilities.

Northwest Magnesite Co. Buys Plant for \$1,000,000

THE Northwest Magnesite Co., at Chewelah, Stevens county, Wash., will take over all the property of the American Mineral Production Co., at Valley, on February 1, for a consideration of approximately \$1,000,000, according to announcement received from C. R. Moore, general manager of the American Mineral Production Co.

"The transfer of our interests to the Northwest Magnesite Co. will take place about February 1," said Mr. Moore. "All of the real and personal property of our company will be included in the transaction. The six-mile railroad owned by our company will be taken over by the purchasers and operated by them."

The American Mineral Products Co.'s plant is at the mine and the finished magnesite is shipped on its railroad from there. The Northwest Magnesite Co.'s mine operations are located near the American mine plant but a team is used to carry the ore to a plant six miles eastward.—*Seattle Journal of Commerce.*

New Cleveland Crushed Stone Co.

THE Belvoir Stone & Supply Co., a new concern of Cleveland, Ohio, recently bought from William T. Arnos of the South Euclid Development Co. a 20-acre tract on Nine Mile creek valley, just west of Green road in South Euclid, for around \$185,000. The tract is underlaid with stone. This will be crushed by the purchaser for use in buildings and on roads. The company also will provide a building supply headquarters.

Editorial Comment

House Joint Resolution No. 1 which has been introduced by Chairman Green of the Committee of Ways and Means of the House of Representatives proposes to amend the Constitution to provide for the taxation of incomes received from the securities issued by states. It is the beginning of what promises to be a hot legislative fight against tax exempt securities. There is a great deal of newspaper propaganda against tax exempt securities just now, and it is evident that the fight will be carried outside the halls of Congress to the public.

ROCK PRODUCTS is naturally interested, as are all its readers, since so much of the money for tax exempt securities has been expended for cement, crushed stone and sand and gravel. For the present it wishes to do no more than to point out that there are two sides to the question. Tax exempt securities are largely responsible for the greatest good the country has received in this generation, good roads. These, by destroying sectionalism, reducing the costs of many necessities and bringing comforts and luxuries to many places which would otherwise have done without them have advanced civilization a full stage, almost as great an advance as came from the introduction of railway transportation. Probably we would have had the roads without tax exempt securities, but certainly we would not have had them so soon. Also it is not to be forgotten that public work largely financed by tax exempt securities took up the slack in the "slump" of 1920 and 1921 and helped to prevent a disastrous panic.

Writing to *Concrete*, Winston E. Wheat, who is the county engineer of Escombia county, Florida, says:

Future Concrete

Specifications "We have shown our faith by our works in this county. On all our county road work we insist on a 3000-lb. concrete." Mr. Wheat's specification is probably one that we shall see in ever increasing use in the near future. We are learning to design concrete to definite strengths, such as "1000-lb.," "2000-lb." or "3000-lb." concrete. Colonel Boyden at the Sand and Gravel Convention in St. Louis gave illustrations of this from actual recent practice on very large and important jobs. So the day may come when such specification phrases as a "1-2-4 mix," and "good, sharp, clean sand" will be deemed archaic. The designer will simply specify the strength of the concrete in compression and look to the contractor to furnish concrete of that strength.

The producers of concrete aggregate should be vitally interested in this, for now that portland cement

may be taken as a fixed quantity the strength of the concrete becomes a matter of the aggregates. The principal point for aggregate producers to bear in mind is the necessity of uniformity in grading. This point was emphasized by Colonel Boyden in his talk and the reason for it is quite obvious. No matter how carefully a concrete mix may have been designed, it is all lost labor if the grading of the aggregate varies so that the mix which is placed in the structure does not conform to that design. Only uniform materials, carefully handled to avoid segregation, will give concrete that can be relied upon to sustain the calculated load with the proper factor of safety.

Presumably most readers of ROCK PRODUCTS have read the letter of Secretary of Commerce Hoover to the coal operators published in the daily papers. It is as bracing and tonic as a cold shower to read such a letter from a government official, in which a spade is given its proper name and not described as a variety of agricultural implement. Mr. Hoover is one man in Washington who cannot be accused of "buck passing."

His cure for the troubles of the coal business is free competition and the full movement of the product. He says flatly that there are too many mines and miners and that the high cost mines ought to be eliminated by the ordinary processes of competition, since they depend on the famine prices which result from suspensions due to strikes and lockouts in order to sell their product.

Mr. Hoover has spoken very plainly to the coal operators. One wishes that he might have the opportunity to speak with equal frankness to the coal miners and tell them how a long-suffering public feels about the constant suspensions of mining due to labor troubles.

At both conventions in St. Louis papers were presented by geologists of note and were well received. It is gratifying to note the growing interest in the geology of rock products and some surprising evidences of that interest turn up occasionally. One of them was mentioned by Professor Dake, who said that the state highway department of Wisconsin had found it profitable to employ a "glaciologist," a specialist of specialists in a geological way, to aid the department in its survey of materials available for highway construction throughout the state. The greater our knowledge of the raw materials of our industries, the greater will be our success in manufacturing them into commercial products to meet specifications of technical experts.

Applied Geology

New Machinery and Equipment

Gypsum Tile Casting Machine

THE substitution of machine molding for hand molding in the making of gypsum blocks and tile is one of the many examples of the tendency to substitute machine for hand work in the rock products industries. Wherever a manufacturing process consists of a series of uniform operations, there is no doubt that the resulting product of machine work is better, aside from the greater efficiency due to the saving in labor and material.

The Her-Born plaster block machine, made by the Her-Born Engineering and Manufacturing Co., of Sandusky, Ohio, offers a case in point. Its blocks are cast to truer dimensions and the angles are truer than would be possible with hand molding under ordinary conditions. This makes them cheaper to lay in the wall. And the saving of labor, of course, is very large.

The following description of the machine and its work is from the report of Virgil Marani, chief engineer of the Gypsum Industries, which is an association formed by gypsum manufacturers for research and publicity work:

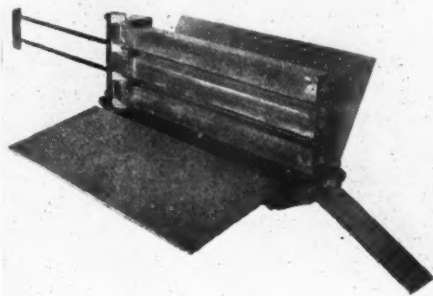
"The tile forms, or molds, are of collapsible type set on edge upon a revolving metal turntable. During revolution each form passes under the mixer and is filled, the process being continuous and entirely under control of the man at the mixer. The rate of revolution, even at maximum speed, provides ample opportunity for the material to set hard so that when each tile mold reaches the point of discharge the tile is

automatically ejected upon a roller or traveling belt conveyor. The cores are of cast non-corrosive metal, and during the process of manufacture are fixed, the tile or block being pushed off the cores at the discharging point.

"The mechanism is not complicated, moving parts being reduced to a minimum. These features suggest economical maintenance and ease of repairs or replacements. The mixing device is practically continuous, but should be adjusted by the manufacturer

changed to provide for 2-in. solid, 3-in. and 4-in. hollow tile. This enables the manufacturer to manufacture the size of tile desired. For example, the standard machine will contain 25 double molds which can all be set for 4-in. tile, or the desired percentage of 2-in. and 3-in. tile can be substituted.

"Working under the disadvantage of poor water supply and cold materials, the machine turned out 92½ sq. ft. of gypsum tile in a little less than 9 min. and, at the time of closing down, was ejecting a tile (2½ sq. ft.) every 6 to 8 sec."



The collapsible mold opens to discharge the tile. The cores are fixed and the tile is pushed off the cores at the moment of discharge

to meet his special conditions and the kind of material he has to work with.

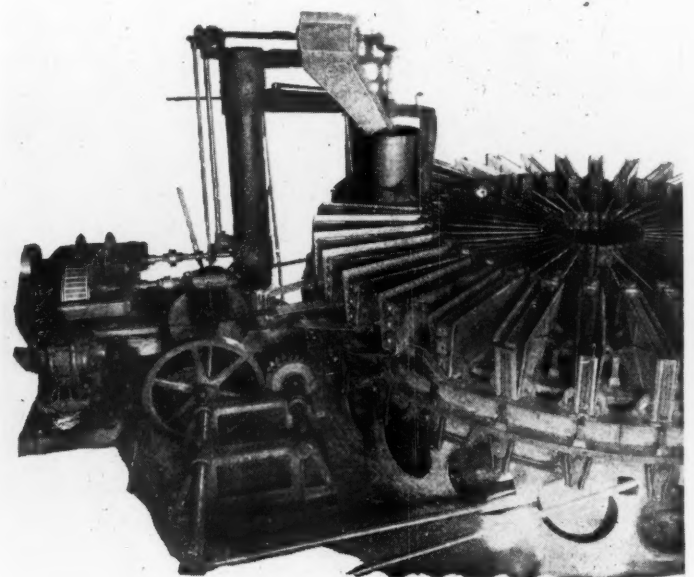
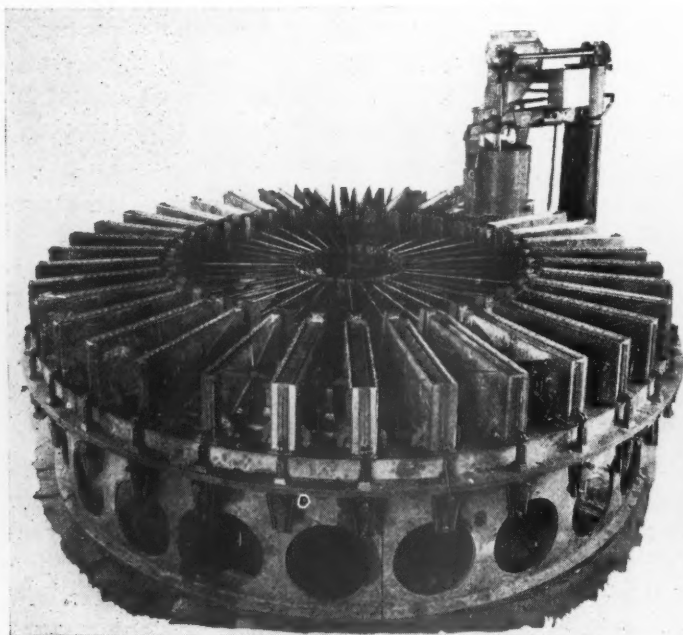
"The standard machine will include improvements and will consist of double molds; that is, two tiles cast into one collapsible type form which is filled with a dividing plate. This will greatly increase the output. The side and end plates of the molds can be

A New Ford Ton Truck

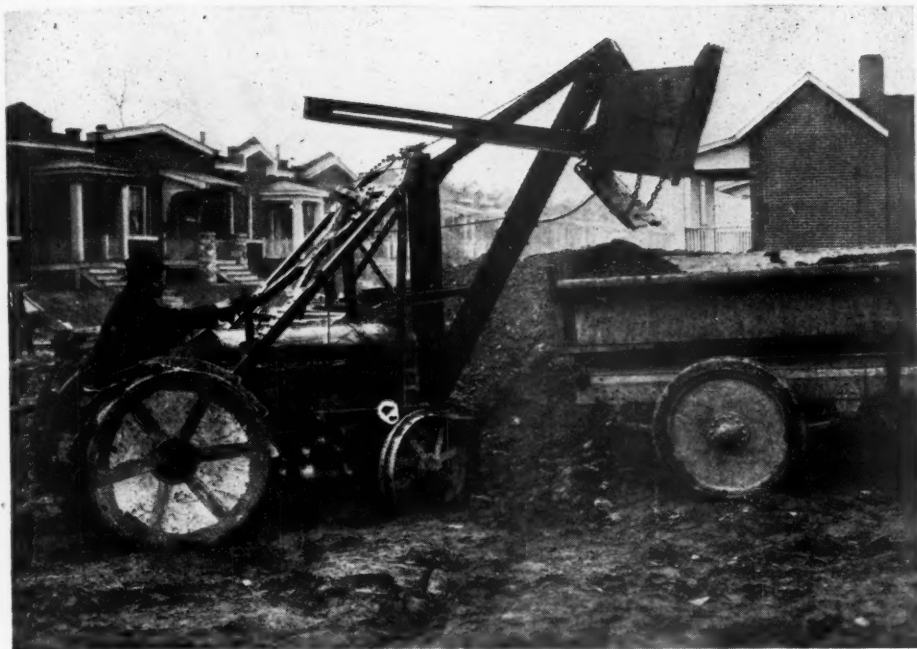
THE Ford Motor Co. enters the new year with a new product, an all steel combination truck body and cab mounted on the standard Ford one ton chassis to be sold as a complete unit. The new body is of the open express type, so constructed that it may be readily converted into other body combinations by using stakes, side boards, canopy top, screen sides, etc.

The body is built of steel to withstand severe usage and presents a new development in construction. The steel sills are reinforced with wood in order to lessen vibration and road shocks, thus making for more durability and longer life. The loading space is 7 ft. 2 in. in length by 4 ft. in width and of convenient and practical depth. The end gate is strongly braced and secured by heavy chains which hold it in position when lowered.

The cab, also of steel construction, is ex-



Left: The Her-Born gypsum tile machine. Right: A view of the mixer and driving mechanism



The "Dig-a-load" a small shovel applied to a Fordson tractor

advantage in handling damp sand that there are no chains and gears to be cut by the adhering sand.

The illustration shows one of these small power shovels which is applied to a Fordson tractor. It is called the "Dig-a-Load" and is made by the Glasgow Engineering Co. of St. Louis.

When the bucket is lowered so that the dipper stick is in a vertical position and the tractor is moved forward the weight of the bucket and dipper stick forces the bucket into the ground. In this way the machine can dig about 6 in. below the plane of the wheels.

By removing the bucket, which means removing only one pin, the machine may be used as a "baby crane" for handling small loads effectively.

There is often a place for a small shovel on plants in which a large shovel is regularly employed.

tra roomy. The seat is of artificial leather, well-cushioned on 4-in. springs. Protection from the weather is afforded by close fitting door curtains mounted on uprights and opening and closing with the door. An oblong window in the back of the cab gives ample facilities for rear vision.

In addition to the saving offered truck users in this body, is the convenience of being able to buy the Ford ton truck complete and ready to put into service.

New Gasoline Hoist

THE Mead-Morrison Manufacturing Co. of East Boston, Mass., long known as manufacturers of a complete line of steam and electric hoisting equipment, have developed a new gasoline hoist—known to the trade as the Handihoist, in which are combined a number of distinctive features.

Before manufacturing a gasoline hoist on a commercial scale, Mead-Morrison engineers made a close study of the good and bad points of various types of gasoline hoists then on the market. Then experimental machines were constructed and modified to fill the exacting requirements of general contracting work.

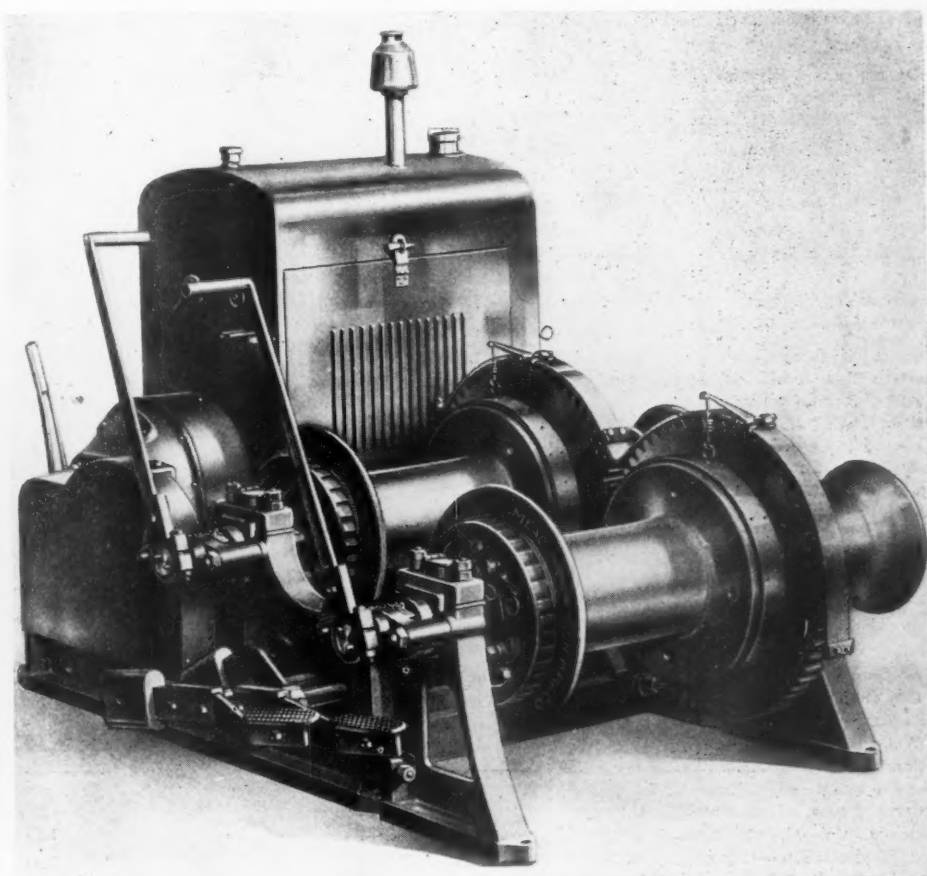
The new Handihoist is now in active use and has proved its ability to stand up under hard use. It is a single-drum machine, made double-drum by bolting on a second unit when desired. The hoist is equipped with cut gears, asbestos-lined frictions and brakes. It has bronze-bushed drums, machined all over. Power is supplied from a four-cylinder, heavy-duty LeRoi engine. The Handihoist is easy to operate, and is adapted to scraper, derrick, elevator and general hoisting work. A hoist of this type should find many applications in the rock products industries.

Small Power Shovel

THE small power shovel belongs rather to the contractor's equipment than to the equipment of a quarry or gravel pit. But it has its uses for the producer. These are especially that of handling material out of stock piles for stripping, loading trucks and cleaning up odd corners out of reach of the larger machine. It has an

New Head of Loomis Machine Company

BRUCE Z. GOOD has been elected president of the Loomis Machine Co., to succeed the late George B. Loomis. Mr. Good was previously secretary-treasurer of the company. Earl B. Naylor was elected vice-president, W. L. Hertzer secretary and treasurer and D. L. Lott superintendent.



The "Handihoist" is a complete unit with engine and one or two drums

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Blakeslee, N. Y.	1.00	1.40	1.40	1.40	1.30	
Buffalo, N. Y.			1.50 per net ton all sizes			
Chaumont, N. Y.	1.00		1.75	1.50	1.50	1.50
Cobleskill, N. Y.	1.25	1.25	1.25	1.25	1.25	
Eastern Pennsylvania	1.35	1.35	1.45	1.35	1.35	1.35
Prospect, N. Y.	.80	1.40	1.40	1.30	1.30	
Watertown, N. Y.	.50		1.75	1.50	1.50	1.50
Western New York	.85	1.25	1.25	1.25	1.25	1.25
CENTRAL:						
Alton, Ill.	1.75		1.75	1.50		
Buffalo, Iowa	1.00		1.45	1.25	1.30	1.30
Chicago, Ill.	.80	1.40	1.10	1.10	1.10	1.10
Dundas, Ont.	.90	1.35	1.35	1.25	1.10	1.10
Greencastle, Ind.	1.25	1.15	1.05	1.05	1.00	1.00
Lannon, Wis.	.70	1.00	1.00	1.00	.90	.90
St. Vincent de Paul, P. Q.	.85	1.20@1.45	1.15	1.05	.95	.95
Sheboygan, Wis.	.90		1.10	1.00		
Stone City, Iowa	.75		1.50†	1.40	1.30	
Toledo, Ohio	1.60	1.70	1.70	1.60	1.60	1.60
Toronto, Canada	1.90‡	2.25‡	2.25‡	2.25‡	2.00‡	2.00‡
Waukesha, Wis.	1.15	1.15	1.15	1.15	1.15	1.15
SOUTHERN:						
Alderson, W. Va.	.75	1.25	1.40	1.25	1.15	
Cartersville, Ga.		1.75	1.50	1.00	1.00	
Dallas, Texas	1.00	1.35	1.35	1.25	1.25	1.25
El Paso, Texas	1.00	1.00	1.00	1.00		
Ft. Springs, W. Va.	.60	1.70	1.70	1.60	1.50	
Garnet and Tulsa, Okla.	.50	1.60	1.60	1.45	1.45	
Graysville, Ga.	.75@1.00	.90@1.25		.75@1.00	.75@1.00	
WESTERN:						
Blue Spr'gs and Wymore, Neb.	.20	1.45	1.45	1.35@1.40	1.25@1.30	1.20
Cape Girardeau, Mo.	1.35*	1.25*	1.25*	1.25*	1.00*	
Kansas City, Mo.	1.00	1.65	1.65	1.65	1.65	1.65

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Branford, Conn.	.60	1.50	1.35	1.15	1.00	
E. Summit, N. J.	2.00			1.80		
Eastern Massachusetts	.85	1.75	1.75	1.40	1.40	1.40
Eastern New York	.75	1.50	1.50	1.30	1.40	1.30
Eastern Pennsylvania	1.25	1.55	1.50	1.40	1.40	1.40
Oakland, Calif.	1.00	1.00	1.00	.90	.90	
Richmond, Calif.	.50*		1.65*	1.50*	1.50*	
San Diego, Calif.	.50@.75	1.80@1.90	1.60@1.80	1.35@1.55	1.35@1.55	1.25@1.45
Springfield, N. J.	2.00	2.10	2.25	2.00	1.90	
Westfield, Mass.	.60	1.50	1.35	1.20	1.10	

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Berlin, Utley and Red Granite, Wis.	1.60	1.70	1.60	1.50	1.40	
Columbia, S. C.	.50		2.00		1.60	
Eastern Penna.—Sandstone	.85	1.60	1.55	1.35	1.35	1.30
Eastern Penna.—Quartzite	1.20	1.35	1.20	1.20	1.20	1.20
Lithonia, Ga.—Granite	.75	1.75	1.75	1.25	1.25	1.25
Middlebrook, Mo.—Granite	3.75@4.00		2.00@2.25	2.00@2.25		1.25@2.00
Sioux Falls, S. D.—Granite	1.00	1.60	1.55		1.50	

*Cubic yd. †1 in. and less. ‡Prices include 90c freight.

Agricultural Limestone (Pulverized)

Cassadaga, N. Y.—Marl, 50 lb. hemp bags	7.00@ 9.00
Chaumont, N. Y.—Analysis, 95% CaCO ₃ , 1.14% MgCO ₃ —Thru 100 mesh; sacks, 4.50; bulk	3.00
Hillsville, Pa.—Analysis, 94% CaCO ₃ , 1.40% MgCO ₃ , 75% thru 100 mesh; 94% thru 50 mesh; sacks, 5.00; bulk	3.50
Jamesville, N. Y.—Analysis, 89.25% CaCO ₃ ; 5.25% MgCO ₃ ; pulverized, bags, 4.00; bulk	2.50
Watertown, N. Y.—Analysis 96-99% CaCO ₃ ; 0.02% MgCO ₃ —90% thru 100 mesh, bags, 4.50; bulk	3.00
New Castle, Pa.—94% CaCO ₃ , 1.40% MgCO ₃ —75% thru 100 mesh, 94% thru 50 mesh; sacks, 5.00; bulk	3.50
West Stockbridge, Rockdale, Mass., North Pownal, Vt.—Analysis, 90% CaCO ₃ —50% thru 100 mesh; paper bags, 4.75; cloth, 5.25; bulk	3.25
Alton, Ill.—Analysis, 98% CaCO ₃ , 0.5% MgCO ₃ ; 90% thru 100 mesh	4.00
Belleville, Ont.—Analysis, 90.9% CaCO ₃ , 1.15% MgCO ₃ —45% to 50% thru 100 mesh, 61% to 70% thru 50 mesh; bulk	2.50
Cypress, Ill.—Analysis, 96.12% CaCO ₃ , 2.5% MgCO ₃ ; 50% thru 100 mesh, 90% thru 50 mesh, 50% thru 50 mesh, 90% thru 4 mesh	1.50
Marblehead, Ohio—Analysis, 83.54% CaCO ₃ , 14.92% MgCO ₃ ; 60% thru 100 mesh; 80-lb p. sacks 5.00; bulk	3.50
Piqua, Ohio—Total neutralizing power 95.3%; 100% thru 10, 60% thru 50; 50% thru 100	2.10@ 2.25
100% thru 10, 90% thru 50, 80% thru 100; bags, 5.00; bulk	3.50
100% thru 100, 85% thru 200; bags, 7.00; bulk	5.50
Waukesha, Wis.—Analysis, neutralizing equivalent 107.38% CaCO ₃ ; 99% thru 10 mesh, 55% thru 60 mesh; bulk	2.35
200-mesh bags ex., returnable	4.50
Hot Springs, N. C.—50% thru 100 mesh; sacks, 4.25; bulk	2.70
Knoxville, Tenn.—80% thru 100 mesh, bags, 3.95; bulk	2.70
Linville Falls, N. C.—Analysis, 57% CaCO ₃ , 39% MgCO ₃ ; 50% thru 100 mesh; 200 lb. hurlap bag, 4.00; bulk	2.75
Mountville, Va.—Analysis, 76.60% CaCO ₃ , 22.83% MgCO ₃ —50% thru 100 mesh; 100% thru 20 mesh; sacks	5.00
Colton, Calif.—Analysis, 95% CaCO ₃ , 3% MgCO ₃ —all thru 20 mesh—bulk	4.00
Lemon Cove, Calif.—Analysis, 94.8% CaCO ₃ , 0.42% MgCO ₃ ; 60% thru 200 mesh; sacks, 5.25; bulk	4.50
Dundas, Ont.—Analysis, 53.80% CaCO ₃ , 43.31% MgCO ₃ —35% thru 100 mesh; 50% thru 50 mesh; 100% thru 10 mesh; bagged, 4.75; bulk	3.00

Agricultural Limestone (Crushed)

Bellevue, Ohio—Analysis, 61.56% CaCO ₃ , 36.24% MgCO ₃ ; ¼ in. to dust, about 20% thru 100 mesh	1.25
Bettendorf, Iowa, and Moline, Ill.—97% CaCO ₃ , 2% MgCO ₃ ; 50% thru 100 mesh; 50% thru 4 mesh	1.50
Buffalo, Iowa—90% thru 4 mesh	1.00
Cape Girardeau, Mo.—Analysis, 93% CaCO ₃ , 3.5% MgCO ₃ ; 90% thru 50 mesh	1.50
Carthage, Mo.—Analysis, 98½% CaCO ₃ ; 100% thru 10 mesh, 30% thru 100 mesh	1.75
Chicago, Ill.—Analysis, 53.63% CaCO ₃ , 37.51% MgCO ₃ ; 90% thru 4 mesh	.80
Elmhurst, Ill.—Analysis, 35.73% CaCO ₃ , 20.69% MgCO ₃ ; 50% thru 50 mesh	1.25
Huntington and Bluffton, Ind.—Analysis, 61.56% CaCO ₃ , 36.24% MgCO ₃ ; about 20% thru 100 mesh	1.25

(Continued on next page)

Agricultural Limestone

(Continued from preceding page)

Greencastle, Indiana.—Analysis, 98% CaCO ₃ ; 50% thru 50 mesh.....	2.00
Kansas City, Mo.—50% thru 100 mesh.....	1.25
Krause and Columbia, Ill.—Analysis, 90% CaCO ₃ , 90% thru 4 mesh.....	1.20
Marblehead, Ohio.—Analysis, 83.54% CaCO ₃ , 14.92% MgCO ₃ ; 100% thru 4 mesh; 83% thru 10 mesh; bulk.....	1.25
Milktown, Indiana.—Analysis, 94.41% CaCO ₃ ; 2.95% MgCO ₃ ; 35% thru 50 mesh.....	1.40@ 1.65
Monroe, Mich.—Analysis, 51.91% CaCO ₃ , 44.17% MgCO ₃ ; agricultural limestone meal, 3/16 in. to dust, 30% thru 100 mesh.....	1.60
Narlio, Ohio.—Analysis, 56% CaCO ₃ , 43% MgCO ₃ ; limestone screenings, 37% thru 100 mesh, 55% thru 50 mesh, 100% thru 4 mesh.....	1.50@ 2.00
Ohio (different points), 20% thru 100 mesh; bulk.....	1.25@ 1.50
Piqua, Ohio—100% thru 4 mesh.....	1.25
River Rouge, Mich.—Analysis, 54% CaCO ₃ , 40% MgCO ₃ ; bulk.....	.80@ 1.40
Stelle, Ill., near East St. Louis on I. C. R.—Thru 1/4-in. mesh.....	1.30
Stone City, Iowa.—Analysis, 98% CaCO ₃ ; 50% thru 50 mesh.....	.75
Waukesha, Wis.—No. 1 kiln dried.....	2.00
No. 2 Natural.....	1.75
Alderson, W. Va.—Analysis, 90% CaCO ₃ ; 90% thru 50 mesh.....	1.75
Claremont, Va.—Analysis, 92% CaCO ₃ , 2% MgCO ₃ ; 90% thru 50 mesh.....	3.00
50% thru 50 mesh, 90% thru 4 mesh, 50% thru 4 mesh.....	2.75
Ft. Springs, W. Va.—Analysis, 90% CaCO ₃ ; 50% thru 100 mesh.....	1.50
Ladd, Ga.—Analysis, 56% CaCO ₃ , 40% MgCO ₃ —all passing 10 mesh.....	1.50@ 1.75
Garnett, Okla.—Analysis, 80% CaCO ₃ , 3% MgCO ₃ ; 100% thru 4 mesh.....	.50
Kansas City, Mo., Corrigan Siding—50% thru 100 mesh; bulk.....	1.80
Tulsa, Okla.—90% thru 4 mesh.....	.50

Miscellaneous Sands

Silica sand is quoted washed, dried and screened unless otherwise stated.

Glass Sand:

Berkeley Springs, W. Va..... 2.25@ 2.50

Cedarville and South Vineland, N. J.—Damp, 1.75; dry..... 2.25

Cheshire, Mass.—24 mesh, 5.00; 40 mesh, 6.00; 100 mesh..... 7.00

Columbus, Ohio..... 1.50@ 1.75

Dunbar, Pa.—Damp..... 2.50

Falls Creek, Pa..... 2.25

Hancock, Md.—Damp, 1.50; dry..... 2.00

Mapleton, Pa..... 2.25@ 2.50

Mapleton Depot, Pa..... 2.00@ 2.25

Massillon, Ohio..... 3.00

Michigan City, Ind..... .50

Millville, N. J..... 2.00

Mineral Ridge, Ohio..... 2.50

Ottawa, Ill..... 1.50

Pacific, Mo..... 2.25@ 3.00

Pittsburgh, Pa.—Dry, 4.00; damp..... 3.00

Ridgway, Pa..... 2.50

Rockwood, Mich..... 2.75@ 3.25

Round Top, Md..... 2.25

Sands, Pa..... 2.50

San Francisco, Calif..... 3.00@ 3.50

St. Louis, Mo..... 2.25@ 3.00

Thayers, Pa..... 2.50

Utica, Ill..... 1.25@ 1.50

Zanesville, Ohio..... 2.50

Foundry Sand:

Albany, N. Y.—Molding fine, brass..... 3.00

Molding coarse..... 2.75

Sand blast..... 4.00

Allentown, Pa.—Core and molding fine..... 1.75@ 2.00

Arenzville, Ill.—Molding fine..... 1.50@ 1.75

Brass molding..... 1.75

Beach City, Ohio.—Core, washed and screened..... 2.00@ 2.50

Furnace lining..... 2.50@ 3.00

Molding fine and coarse..... 2.25@ 2.50

Cheshire, Mass.—Furnace lining, molding fine and coarse..... 5.00

Sand blast..... 5.00@ 8.00

Stone sawing..... 6.00

Cleveland, Ohio—Molding coarse..... 1.50@ 2.00

Brass molding..... 1.50@ 2.00

Molding fine..... 1.50@ 2.25

Core..... 1.25@ 1.50

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, f. o. b. producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, 1/4 in. and less	Gravel, 1/2 in. and less	Gravel, 1 in. and less	Gravel, 1 1/2 in. and less	Gravel, 2 in. and less
EASTERN:						
Ambridge and So. Hts., Pa.....	1.25	1.25	1.15	.85	.85	.85
Buffalo, N. Y.....	1.10	.95	.....	.....	.85	.....
Erie, Pa.....	.....	1.00	.....	1.25	.....	1.75
Farmingdale, N. J.....	.68	.68	.75	.....	1.30	.....
Pittsburgh, Pa.....	1.25	1.25	1.00	1.00	.85	.85
Portland, Me.....	.....	.50	1.75	.....	1.35	1.25
Washington, D. C.—Rewashed, river.....	.75	.75	1.60	1.40	1.20	1.20
CENTRAL:						
Columbus, Ohio.....	.75	.75@1.15	.75@1.15	.75	.75@1.15	.75
Covington, Ind.....	.75	.75	.75	.75	.75	.75
Des Moines, Iowa.....	.50	.50	1.25	1.60	1.60	1.60
Unwashed ballast, .50 ton						
Attica, Ind.....	.75	.75	.75	.75	.75	.75
Eau Claire, Wis.....	.40	.40	.85@1.35	.....	.85@ .95	.95
Elkhart Lake, Wis.....	.60	.60	.70	.70	.70	.70
Grand Rapids, Mich.....	.....	.50	.....	.80	.....	.70
Hamilton, Ohio.....	.....	1.00	.....	.....	1.00	.....
Hersey, Mich.....	.....	.50	.....	.....	.....	.70
Indianapolis, Ind.....	.60	.60	.....	1.50	.75@1.00	.75@1.00
Janesville, Wis.....	.....	.65@ .75	.....	.....	.65@ .75	.....
Mason City, Iowa.....	.65	.65	1.70	1.70	1.65	1.65
Mankato, Minn.....	.40a	.40	.50†	.....	.....	.....
Milwaukee, Wis.....	1.11	1.11	1.36	1.36	1.36	1.36
Moline, Ill.....	.60	.60	.....	.....	.....	.....
Palestine, Ill.....	.75	.75	.75	.75	.75	.75
St. Louis, Mo., f.o.b. cars.....	1.20	1.45	1.65‡	1.45	.....	1.45||
Silverwood, Ind.....	.75	.75	.75	.75	.75	.75
Summit Grove, Ind.....	.75	.75	.75	.75	.75	.75
Terre Haute, Ind.....	.75	.75	.90	.90	.75	.75
Waukesha, Wis.....	.50	.50	.80	.80	.80	.80
Winona, Minn.....	.40	.40	1.75	1.50	1.40	1.40
(.05 ton discount 10 days)						
SOUTHERN:						
Brookhaven, Miss.; Roseland, La.....	.....	.25	.....	.....	1.00	.....
Charleston, W. Va.....	all sand 1.40 f.o.b. cars	.....	all gravel 1.50 f.o.b. cars	.....	.....	.....
Ft. Worth, Texas.....	2.25	2.25	2.25	2.25	2.25	2.25
Knoxville, Tenn.....	1.00	1.00	1.20	1.20	1.20	1.20
Lake Weir, Fla.....	.....	.50	.....	.....	.....	.....
New Martinsville, W. Va.....	1.00	1.00	.....	1.20	.....	.80
WESTERN:						
Kansas City, Mo.....	.....	.....	Kaw river sand .75 per ton f.o.b. plants	.....	.....	.....
Los Angeles, Calif.....	.....	.85@1.15	1.00@1.25	1.00@1.25	1.00@1.25	.....
Pueblo, Colo.....	1.10*	.90*	.....	1.60*	1.60*	.....
San Diego, Calif.....	.50@.65	.80@.90	1.40@1.50	1.20@1.30	1.00@1.10	1.00@1.10
Seattle, Wash. (bunkers).....	1.50*	1.50*	1.50*	.....	1.50*	1.50*
Webb City, Mo.....	.75	.75	.25@ .75b	.....	1.25c	1.15c

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, 1/4 in. and less	Gravel, 1/2 in. and less	Gravel, 1 in. and less	Gravel, 1 1/2 in. and less	Gravel, 2 in. and less
Boonville, N. Y.....	.60@ .80	.....	.55@ .75	.....	.....	1.00
Brookhaven, Miss., Rosel'd, La.....	.75	.50	.....	.....	1.25	.....
Dudley, Ky.....	1.00	1.00	.....	.95	.....	.....
Elkhart Lake, Wis.....	.60	.50	.....	.....	.....	.50
Fishers, N. Y.....	.60	.....	.60	.....	.....	.53
Gainesville, Texas.....	.....	.95	.....	.....	.....	.60
Grand Rapids, Mich.....	.....	.....	.....	.....	.70	.....
Hamilton, Ohio.....	.....	.....	.....	.50	.....	.....
Hersey, Mich.....	.....	.....	.....	.....	.....	.....
Indianapolis, Ind.....	.....	.....	.....	.....	.....	.....
Lindsay, Texas.....	.....	.95	.....	.....	.....	.55
Mankato, Minn.....	.....	.....	.....	.....	.....	.....
Moline, Ill.....	.60	.60	.....	.....	.....	.....
St. Louis, Mo.....	.....	.50	.50	.50	.50	1.55
Summit Grove, Ind.....	.50	.50	.50	.50	.50	.50
Waukesha, Wis.....	.60	.60	.60	.60	.60	.60
Winona, Minn.....	.60	.60	.60	.60	.60	.60
York, Pa.....	.95@1.20	.....	(crushed rock)	.....	.....	.....
Zanesville, Ohio.....	.....	.60	.....	.....	.....	.....
Mixed gravel for concrete work, .65						
Pit run gravel, .50						
Concrete gravel, 50% G., 50% S., 1.00						

*Cubic yd.; †pit run; §3/4 in. and less; ‡crushed rock; ||2 1/2 in. and less; (a) 3/4 in. and less; (b) flint cherts; (c) crushed flint.

Crushed Slag

City or shipping point	Roofing	¾ in. down	¾ in. and less	¾ in. and less	1½ in. and less	2½ in. and less	3 in. and larger
EASTERN:							
Buffalo, N. Y.	2.35	1.25	1.25	1.25	1.25	1.25	1.25
Eastern Penn. and Northern N. J.	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Western Penn.	2.50	1.25	1.50	1.25	1.25	1.25	1.25
CENTRAL:							
Ironton, O.	2.05	1.45	1.45	1.45	1.45	1.45	1.45
Jackson, O.	1.35	1.35	1.35	1.35	1.35	1.35	1.35
Toledo, O.	1.50	1.35	1.50	1.35	1.35	1.35	1.35
Youngstown, Dover, Hubbard, Leetonia, Struthers, O.	2.00	1.25	1.35	1.25	1.25	1.25	1.25
SOUTHERN:							
Alabama City, Ala.	2.05	.80	1.25	1.15	1.10	.95	.85
Ashland, Ky.	1.55	1.55	1.55	1.55	1.55	1.55	1.55
Ensley, Ala.	2.05	.80	1.25	1.15	1.10	.95	.85
Longdale, Goshen, Glen Wilton, Roanoke, Low Moor, Ruesens, Va.	2.50	1.00	1.25	1.25	1.25	1.15	1.15

Lime Products (Carload Prices Per Ton F.O.B. Shipping Point)

	Finishing hydrate	Masons' hydrate	Agricultural hydrate	Chemical hydrate	Ground burnt lime, Blk. Bags	Lump lime, Blk. Bbl.
EASTERN:						
Adams, Mass.			7.00			2.90
Bellefonte, Pa.		10.50*	10.50*	10.50*	9.00	8.50 1.80
Buffalo, N. Y.		11.00		12.00		10.00
Berkeley, R. I.			12.00			2.30
Lime Ridge, Pa.						5.00a
West Stockbridge, Mass.						2.25
Williamsport, Pa.			10.00			6.00
York, Pa. (dealers' prices)		10.50	10.50	11.50		8.50 1.65b
CENTRAL:						
Cold Springs, Ohio	12.50	11.00	10.00		9.00 11.00	10.00
Delaware, Ohio	12.50	10.00	9.00	11.00		9.00 1.60
Gibsonburg, Ohio	12.50	11.00	10.00		9.00 11.00	10.00
Huntington, Ind.	12.50	11.00	10.00			10.00 1.60c
Luckey, Ohio	12.50†	11.00	9.00†			10.00 1.60
Marblehead, Ohio		11.00	10.00			10.00 1.60d
Marion, Ohio		11.00	10.00			10.00 1.80†
Sheboygan, Wis.					9.00	9.50 10.25g
Tiffin, Ohio					9.00	9.00 11.00
White Rock, Ohio	12.50				9.00 10.50	9.00f 1.60
Woodville, O. (dlrs.' price)	12.50†	10.00†	9.00†	12.50		
SOUTHERN:						
Erin, Tenn.						7.50 1.35
El Paso, Texas						9.00 1.50
Karo, Va.						7.00 1.50
Knoxville, Tenn.	12.50	11.00	11.00	11.00	8.50	8.50 1.50
Ocala and Zuber, Fla.	13.00		9.00		11.00	10.00 1.70
Sherwood, Tenn.	12.50	11.00	11.00	11.00		8.50 1.50
Staunton, Va.					4.50	8.50 1.35
WESTERN:						
Colton, Calif.			15.00			19.70
Kirtland, N. M.						15.00
San Francisco, Calif.	22.00	22.00		22.00		2.50
Tehachapi, Calif.						13.00 2.10e

*Paper sacks; †180-lb. net, non-returnable metal barrel; ‡50-lb. paper bags, terms 30 days net, 25c per ton or 5c per bbl. discount for cash in 10 days from date of invoice; †180-lb. paper bags; (a) F. O. B. kilns; (b) 180 lb. net, 2.65, 250 lb. net; (c) wooden bbl.; (d) wooden, 1.60, steel, 1.80; (e) wooden bbl., steel bbl., 2.20; (f) F. O. B. Marion; (g) ton.

Miscellaneous Sands

(Continued from preceding page)

Columbus, Ohio—Core	.50@ 2.00
Furnace lining	2.00@ 2.50
Molding fine and coarse	1.50@ 2.50
Sand blast	3.50@ 5.50
Stone sawing	1.50@ 1.75
Traction	.50@ 1.50
Brass molding	2.00@ 3.00
Delaware, N. J.—Molding fine	2.00
Molding coarse	1.90
Brass molding	2.15
Dunbar, Pa.—Traction	2.50
Dundee, Ohio.—Glass, core, sand blast traction	2.50
Molding fine, brass molding (plus 75c for winter loading)	2.00
Molding coarse (plus 75c for winter loading)	1.75
Eau Claire, Wis.—Sand blast	3.25
Traction	.50@ .85
Falls Creek, Pa.—Molding, fine and coarse	1.75
Sand blast	2.00
Traction	1.75
Franklin, Pa.—Core	2.00
Furnace lining	2.50
Molding coarse	2.00
Brass molding	2.75
Joliet, Ill.—No. 2 molding sand and loam for luting purposes; milled	.80
Bank run	.65
Kansas City, Mo.—Missouri river core	.80

Kasota, Minn.—Sand blast, stone sawing	1.50
Mapleton Depot, Pa.—Molding fine	2.00@ 2.50
Traction	2.00@ 2.25
Roofing sand	2.25
Massillon, Ohio—Molding fine, coarse, furnace lining and core	3.00
Traction	2.75
Michigan City, Ind.—Core	.50@ .55
Traction	.40
Millville, N. J. Core	2.00
Mineral Ridge, Ohio—Furnace lining, molding fine and coarse, roofing sand, sand blast, stone sawing, core, traction (green)	2.00
Montoursville, Pa.—Core	1.50@ 1.75
Molding fine and coarse	2.00
Traction	1.25
Brass molding	2.50
New Lexington, Ohio—Molding fine	2.75
Molding coarse	2.50
Ottawa, Ill.—Molding, coarse (crude)	1.00@ 1.25
Ottawa, Minn.—Crude silica sand	.75@ 1.00
Pacific, Mo.—Core, furnace lining	1.00@ 1.25
Molding fine	.90@ 1.00
Stone sawing	1.00@ 1.75
Ridgway, Pa.—Core	2.00
Furnace lining, molding fine, molding coarse	1.25
Traction	2.25
Rockwood, Mich.—Roofing sand	3.00
Sand blast	3.75
Round Top, Md.—Roofing sand	2.25
Traction	1.75
Core	1.60

Miscellaneous Sands

(Continued)

San Francisco, Calif. (washed and dried)—Core, molding fine, roofing sand and brass molding	3.00@ 3.50
(Direct from pit)	
Furnace lining, molding coarse, sand blast	3.60
Stone sawing, traction	2.30
Tamalco, Ill.—Molding coarse	1.40@ 1.60
Thayers, Pa.—Core	2.00
Furnace lining	1.25
Molding fine and coarse	1.25
Traction	2.25
Utica, Ill.—Core (crude and dry)	.85@ 1.50
Furnace lining, molding fine and coarse (crude and dry), brass molding	.85@ 1.50
Roofing sand, stone sawing	1.25@ 2.50
Sand blast	2.50
Traction	1.25
Warwick, Ohio—Core, green, 2:00; dry	2.50
Molding fine, molding coarse, green, 2:00; dry	2.90
Traction	2.90
Zanesville, Ohio—Molding fine	2.00@ 2.50
Brass molding	2.00@ 3.00
Core, molding coarse	2.25@ 2.50
Furnace lining, molding steel	2.00
Traction	2.50

Talc

Prices given are per ton f.o.b. (in carload lots only), producing plant, or nearest shipping point.

Asheville, N. C.—Best white and 200-mesh (per ton)	8.00
Yellow (per ton)	9.00
Red (per ton)	13.00
Baltimore, Md.—Crude talc (mine run)	3.00@ 4.00
Ground talc (20-50 mesh), bags	10.00
Cubes	55.00
Blanks (per lb.)	.08
Pencils and steel workers' crayons, per gross	1.25
Chatsworth, Ga.—Crude talc (grindings)	6.00
Crude (gray)	4.50@ 5.00
Ground (60-80 mesh) (bags extra)	6.50@ 7.50
Ground (150-200 mesh), bulk	8.00@15.00
Pencils and steel workers' crayons, per gross	1.50@ 2.50
Chester, Vt.—Ground talc (150-200 mesh), bulk	8.00@ 9.00
Including bags	9.00@10.00
Emeryville, N. Y.—(325 mesh), bags	14.75
Haitesboro, N. Y.—Ground talc (150-250 mesh), bags	18.00
Henry, Va.—Crude talc (lump mine run) per 2000-lb. ton	3.00@ 3.50
Ground (150-200 mesh), bags	8.75@16.00
Keeler, Calif. (200 mesh)	15.00@20.00
(300 mesh)	20.00@30.00

(Bags extra)

Los Angeles, Calif.—Crude	15.00@22.00
Marshall, N. C.—Crude (gray)	4.50@ 5.00
Ground (60-80 mesh) (bags extra)	6.50@ 7.50
Ground talc (150-200 mesh); bags	8.00@12.00
Natural Bridge, N. Y.—Ground talc (300-325 mesh), 200 lb. bags	13.00@15.00
Rochester and East Granville, Vt.—Ground talc (20-50 mesh), bulk	8.50@10.00
Ground talc (150-200 mesh), bulk	10.00@22.00
Vermont—Ground talc (20-50 mesh); bags	7.50@ 8.50
Ground talc (150-200 mesh); bags	10.00@16.00
Waterbury, Vt.—Ground talc (20-50 mesh), bulk	7.50@10.00

(Bags extra)

Ground talc (150-200 mesh), bulk...10.00@22.50

(Bags extra)

Pencils and steel workers' crayons, per gross...1.20@ 2.50

Rock Phosphate

(Raw Rock)

Per 2240-lb. Ton

Centerville, Tenn.—B.P.L. 65%, bags	8.50
Bulk	6.50
Gordonsburg, Tenn.—B.P.L. 68-72%	5.50@ 6.00
Mt. Pleasant, Tenn.—Analysis, 65% B.P.L. (2000 lb.)	6.50
Tennessee—F. O. B. mines, gross ton, unground Tenn. brown rock, 72% min. B.P.L.	5.50
Paris, Idaho—2000 lb. mine run, B.P.L. 75%	4.50@ 5.00
Ottawa, Minn.—All crude silica sand	.75@ 1.00

(Continued on next page)

Roofing Slate

The following prices are per square (100 sq. ft.) for Pennsylvania Blue-Clay Roofing Slate, f. o. b. cars quarries:

Sizes	Genuine Bangor, Washington Big Bed, Franklin	Genuine Albion	Slatington Small Bed	Genuine Bangor Ribbon
24x12	\$10.20	\$10.00	\$8.10	\$7.80
24x14	10.20	10.00	8.10	7.80
22x12	10.80	10.00	8.40	8.75
22x11	10.80	10.50	8.40	8.75
20x12	12.60	10.50	8.70	8.75
20x10	12.60	11.00	8.70	8.75
18x10	12.60	11.00	8.70	8.75
18x 9	12.60	11.00	8.70	8.75
16x10	12.60	11.00	8.40	8.75
16x 9	12.60	11.00	8.40	8.75
16x 8	12.60	11.00	8.40	8.75
18x12	12.60	11.00	8.70	8.75
16x12	12.60	11.00	8.40	8.75
14x10	11.10	11.00	8.10	7.80
14x 8	11.10	10.50	8.10	7.80
14x 7 to 12x6	9.30	10.50	7.50	7.80
24x12	Mediums \$ 8.10	Mediums \$8.10	Mediums \$7.20	Mediums \$5.75
22x11	8.40	8.40	7.50	5.75
Other sizes	8.70	8.70	7.80	5.75

For less than carload lots of 20 squares or under, 10% additional charge will be made.

(Continued from preceding page)

(Ground Rock)

Wales, Tenn.—B.P.L. 70%.....	7.75
Barton, Fla.—Analysis, 50-65% B.P.L. Per 2000-lb. ton.....	3.50@ 8.00
Mt. Pleasant, Tenn.—B.P.L. 65%.....	6.50
Twomey, Tenn.—B.P.L. 65%.....	6.00@ 6.50

Florida Soft Phosphate

(Raw Land Pebble)

Per Ton

Florida—F. O. B. mines, gross ton, 68/66% B.P.L.	2.50
70% min. B.P.L.	2.75
72% min. B.P.L.	3.00
75/74%	4.00
77/76%	5.00
Jacksonville (Fla.) District.....	10.00@12.00

(Ground Land Pebble)

Per Ton

Jacksonville (Fla.) District.....	14.00
Add 2.50 for sacks.....	
Morristown, Fla.—26% phos. acid.....	16.00
Mt. Pleasant, Tenn.—65% B.P.L.....	5.75

Fluorspar

Fluorspar—80% and over calcium fluoride, not over 5% silica; per ton f.o.b. Illinois and Kentucky mines.....	22.00
Fluorspar—85% and over calcium fluoride, not over 5% silica; per ton f.o.b. Illinois and Kentucky mines.....	23.50

Special Aggregates

Prices are per ton f. o. b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco chips
Barton, Wis., f.o.b. cars		10.50
Chicago, Ill.—Stucco chips, in sacks f.o.b. quarries		17.50
Deerfield, Md.—Green; bulk	7.00	7.00
Easton, Pa.—Slate granules		6.50@ 7.00
Granville, N. Y.—Red slate granules		7.50

Harrisonburg, Va.—Blk. marble (crushed, in bags).....

Ingomar, Ohio (in bags)	14.50	14.50
Mertztown, Pa. (granite) bags, \$10.00: bulk		8.00
Milwaukee, Wis. (del.)	14.00@28.00	
Newark, N. J.—Roofing granules		7.50
New York, N. Y.—Red and yellow Verona		32.00
Middlebrook, Mo.—Red	25.00@30.00	
Phillipsburg, N. J.—Evergreen, bulk	8.00@10.00	8.00@10.00
Crete and royal, bulk	15.00@20.00	15.00@20.00
Poultney, Vt.—Slate granules		7.50
Red Granite, Wis.		7.50
Sioux Falls, S. D.	7.50	7.50
Tuckahoe, N. Y.—(2000 lb.)		@20.00
Whitestone, Ga.—White marble chips, net ton in bulk, f.o.b. cars, granite	4.50@ 6.00	4.50@ 6.00

Concrete Brick

Prices given per 1000 brick, f.o.b. plant or nearest shipping point.

	Common	Face
Carpenterville, N. J.	19.00	31.50@45.00
Ensley, Ala. ("Slagtex")	16.00	26.00
Eugene, Ore.	25.00	35.00@70.00
Friesland, Wis.	21.00	32.00
Omaha, Neb.	18.00	30.00
Portland, Ore. (Del'd)	21.00	45.00@55.00
Puyallup, Wash.	20.00	30.00@75.00
Rapid City, S. D.	18.00	22.50@40.00
St. Paul, Minn.	15.00	35.00
Watertown, N. Y.	18.00@21.00	32.00@35.00
Wauwatosa, Wis.	15.00@16.00	28.00@75.00
Winnipeg, Can.	18.00	26.00

Sand-Lime Brick

Prices given per 1,000 brick f. o. b. plant or nearest shipping point, unless otherwise noted.

Baron, Wis.	19.50
Boston, Mass.	15.00@16.00
Dayton, Ohio	12.50@13.50
Grand Rapids, Mich.	11.00
Lancaster, N. Y.	14.00
Michigan City, Ind.	11.00
Milwaukee, Wis. (delivered)	14.00
Portage, Wis.	15.00

Rives Junction and Saginaw, Mich..... 12.00
Syracuse, N. Y. (delivered at job)..... 20.00
F.o.b. cars 15.00@16.00

Gray Klinker Brick

El Paso, Texas 13.00

Lime

Warehouse prices, carload lots at principal cities.

	Hydrate per Ton	Finishing Common
Atlanta, Ga.	23.00	14.00
Baltimore, Md.	24.25	17.85
Cincinnati, Ohio	16.80	14.30
Chicago, Ill.	20.00	20.00
Dallas, Tex.	20.00	
Denver, Colo.	24.00	
Detroit, Mich.	20.00	19.00
Minneapolis, Minn. (white)	25.50	21.00
Montreal, Que.		21.00
New York, N. Y.	18.20	13.10
St. Louis, Mo.	24.00	20.00
San Francisco, Calif.	22.00	
Seattle, Wash. (paper sacks)	24.00	

Portland Cement

Prices per bbl. and per bag net in carload lots.

	Per Bag	Per Bbl
Atlanta, Ga.		2.60
Boston, Mass.		2.63
Buffalo, N. Y.		2.48
Cedar Rapids, Iowa	.60	2.40
Cincinnati, Ohio	.59 1/4	2.37
Cleveland, Ohio	.60 1/4	2.41
Chicago, Ill.	.55	2.20
Columbus, Ohio		2.44
Dallas, Texas	.52 1/2	2.10
Davenport, Iowa	.57 1/4	2.29
Dayton, Ohio		2.44
Denver, Colo.		2.84
Detroit, Mich.	.59 1/4	2.37
Duluth, Minn.	.54 1/4	2.25
Indianapolis, Ind.	.57 1/4	2.31
Kansas City, Mo.	.66 1/4	2.37
Los Angeles, Cal. (less 5c dis.)	.77	3.08
Memphis, Tenn.		2.60
Milwaukee, Wis.	.58 1/4	2.35
Minneapolis, Minn.	.61	2.42
Montreal, Canada (aka. 20c ext.)		2.25
New Orleans, La.		2.90
New York, N. Y.		2.25
Philadelphia, Pa.		2.41
Phoenix, Ariz.		3.40
Pittsburgh, Pa.	.54 1/4	2.19
Portland, Ore.		3.05
San Francisco, Cal.		2.61
St. Louis, Mo.	.55	2.20
St. Paul, Minn.	.61	2.42
Seattle, Wash. (10c bbl. dis.)		2.90
Toledo, Ohio	.60	2.33

NOTE—Add 40c per bbl. for bags.

Mill prices f. o. b. in Carload Lots to Contractors

	Per Bag	Per Bbl.
Buffington, Ind.	.46 1/4	1.95
Cincinnati, Ohio		3.00 1/2
Concrete, Wash.		2.60
Dallas, Texas		2.15
Dayton, Ohio		2.85 1/2
El Paso, Tex.		3.20*
Hannibal, Mo.		1.95
Hudson, N. Y.		2.05
Indianapolis, Ind.		2.96 1/2
Leeds, Ala.		1.95
Los Angeles, Calif.		2.65
Louisville, Ky.		2.37
Memphis, Tenn.		3.24 1/2
Northampton, Pa.		1.95
Phoenix, Ariz.		4.30 1/2
St. Paul, Minn.	.50	2.06
Universal, Pa.	.48 1/4	2.00

*Gross, 10c sacks and 10c per bbl. disc 10 days.

†Including cloth sacks.

‡Gross, 15c sacks and 5c per bbl. disc. 10 days

Gypsum Products—CARLOAD PRICES PER TON AND PER M SQUARE FEET, F. O. B. MILL

	Crushed Rock	Ground Gypsum	Agri-cultural Gypsum	Stucco* Calcinced Gypsum	Cement† and Gauging Plaster	Wood Fiber	White‡ Gauging	Sanded Plaster	Keene's Cement	Trowel Finish	Plaster Board— 1/4x32x36" Weight 1500 lb. Per M Sq. Ft.	Board— 1/2x32x36" Weight 1850 lb. Per M Sq. Ft.	Wallboard. 1/2x32 or 48" Lengths 6'-10', 1850 lb. Per M Sq. Ft.
Black Hawk, S. D.	3.50		7.00	8.00	10.00	10.50							
Douglas, Ariz.		6.00	6.00		13.00								
Fort Dodge, Iowa	3.00	3.50	6.00	8.00	10.00	10.50	20.00		21.30	20.00	20.00		30.00
Garbutt, N. Y.			6.00	8.00	10.00	10.00		7.00				20.00	
Grand Rapids, Mich.	3.00		5.00	10.00	10.00	10.00			31.00		19.75	20.00	30.00
Hanover, Mont.	4.50		6.00	10.00		10.50							
Mound House, Nev.		8.50	6.50	10.50@11.50									
Oakfield, N. Y.	3.00	4.00	6.00	8.00	10.00	10.00	20.20	7.00+	30.75	21.00	19.375	20.00	30.00
San Francisco, Calif.				16.40									
Winnipeg, Man.	5.50	5.50	7.00	13.50	15.00	15.00					28.50		35.00

NOTE—Returnable Bags, 10c each; Paper Bags, \$1.50 per ton extra (not returnable).

*Shipment in bulk 25c per ton less; †Bond plaster \$1.50 per ton additional; ‡Sanded Wood Fiber \$2.50 per ton additional; §White Moulding 50c per ton

News of All the Industry

Incorporations

Edgerton Concrete Products Co., Wilson, N. C. Capital, \$100,000.

Mathers Stone Co., Clear Creek, Ind., increased capital from \$100,000 to \$210,000.

Niagara Sand Corp., Buffalo, N. Y., \$80,000 to \$200,000. Increase of capitalization.

Watertown (N. Y.) Stone Products Co. has increased its capital stock from \$10,000 to \$50,000.

Keweenaw Limestone Co., Lemon Cove, Calif.—Capital stock, \$100,000; shares, 1000; subscribed, \$300.

The Universal Crusher Co., Cedar Rapids, Iowa, has been authorized to modify and enlarge its objects.

Roslyn Concrete Products Co., Inc., Dover, Del.—Dealing in all kinds of building material; capital, \$100,000.

Knoxville Roof Tile and Concrete Co., Knoxville, Tenn., has increased its capital stock from \$10,000 to \$50,000.

Dallas Sand and Gravel Co. has been incorporated in Dallas, Texas, by Y. J. Hawkins, H. A. Turner and others.

Sumter Rock and Timber Co. has been incorporated in Leesburg, Fla., with a capital of \$10,000, by W. C. Wilkins and others.

Okauchee Sand and Gravel Co., Milwaukee, \$35,000—350 shares par \$100; W. D. Ryan, Francis Doherty and Arthur J. Stock.

Little Falls Sand and Gravel Co., 272 Bellevue avenue, Upper Montclair, New Jersey—Sand, gravel, stone, cement, etc.; capital, \$100,000.

Delans Corp., Manhattan—Realty, construction, quarrying, etc.; capital, \$100,000. Incorporator: L. S. Landes, 233 Broadway, New York.

Stanley Cement and Lime Co., of Wheeling, W. Va., has been given authorization to increase its capital stock from \$800,000 to \$1,600,000.

W. H. Gill & Sons, Brooklyn, N. Y., lime and bluestone, \$10,000; W. H., W. N. and C. Gill. (Attorney, H. Hetkin, 32 Court street, Brooklyn.)

American Concrete Railway Tie Co. has been incorporated in Marmarth, N. D., with a capital of \$25,000, by H. A. Ekholm, Henry O. Connell and others.

Christiana Sand Co. Own and operate sand and gravel pits. \$100,000. Charles B. Bishop, E. H. Feustel, R. H. Ocheltree, Wilmington, Del. (Delaware Charter Co.)

Johnson Bros. Concrete Co. has been incorporated for \$15,000 by Ernest Johnson, Fred Johnson, Carl Høglund and Carl Soderstrom, all of West Duluth, Minn.

Central Sand, Stone and Supply Co., of Johnstown, Pa., has changed its name to Bald Eagle Sand and Supply Co. and increased its capital from \$30,000 to \$100,000.

Armstrong Sherrod Sand Co., Knoxville, Tenn., capitalized at \$5000 with H. E. Armstrong, W. H. Sherrod, M. M. Thomas, John Hill and S. O. Houston, incorporators.

Blue Bell Lime Products Co. Quarry limestone, granite, etc. \$200,000. F. R. Hansell, J. Vernon Pimm, E. M. MacFarland, Philadelphia. (Corporation Guarantee and Trust Co.)

Jackson Reinforced Concrete Pipe Co. has been incorporated in Jackson, Mich., with a capital stock of \$30,000 and with offices at 601 and 602 Central State building.

Grove Stone and Sand Co., Swannanoa, N. C., authorized capital, \$200,000; incorporators: W. R. Ellerson, C. C. Buquo, Hot Springs, N. C., Charles G. Lee, Asheville, N. C.

Western Foundry Sand Co. has been incorporated in Seattle, Wash., at 1140 Elliott avenue, W., with a capital of \$40,000, succeeding a firm of the same name, by W. R. Tompkins, Robert Neidergesaess and E. A. Strout.

Woodbury Estate Mines, Inc., Augusta, Me.—To mine, quarry, drill for, smelt, refine, prepare for market, etc., deal in coke, sand, gravel, minerals, construct, maintain sidings, wharves, engines, factories, houses, hotels, stores, etc., and do all things incident; capital, \$2,000,000.

Ralph P. Bova Co., Inc., formed to manufacture artificial stone and to deal in building materials, etc. Capital, \$20,000. Directors are R. P. Bova, 6510 14th avenue; Frank Stagliano, 244 68th

street., and Benjamin L. Stein, 8124 Fourth avenue, Brooklyn, N. Y.

Bay Cities Gravel Co. has been incorporated in Redondo Beach, Calif., with a capital stock of \$50,000, by Chas. E. Beckley and Sam E. Arey of Redondo and Thos. W. Scott, Chas. L. Wigg, B. W. Kuhm and N. R. Kuhm, of Manhattan Beach.

South Ottawa Silica Co., 411 Central Life bldg., Ottawa, Ill. Capital, \$30,000. Mine, quarry and transport clay, sand ores, minerals, etc. Incorporators: F. A. Cebulski, Thomas E. White, J. J. Schuneman. Correspondent: Hector C. Hitt, Central Life bldg., Ottawa.

Florida McCracken Concrete Pipe Co. has been incorporated in Sanford, Fla., with a capital of \$300,000, with W. J. McCracken as president, and will erect a plant with capacity of 2500 ft. of concrete sewer pipe per y. C. D. Watson, of St. Petersburg, Fla., will be plant superintendent.

Wakefield Crushed Stone Co. of Bessemer, Mich., has obtained incorporation papers from the secretary of state at Lansing. The new corporation will control the operations of the big rock crushing plant which was erected two years ago by W. S. Peters, who is president of the company.

The Intermountain Concrete Co., a subsidiary of the Portland Cement Co., located at Ogden, Utah, has filed an amendment to its articles of incorporation, enlarging the scope of the company and increasing the capital stock from \$25,000 to \$150,000. There are 150 shares of stock, valued at \$100 each, with 75 shares of preferred and 750 shares of common stock. All stock is non-assessable.

Sand and Gravel

Croton Sand and Gravel Co., Croton, N. Y., is installing a 15-ton, crawl tread locomotive crane.

Pioneer Sand and Gravel Co., Seattle, Wash., has contracted to buy sand and gravel from Waterway District No. 2, an improvement district.

Boston Sand and Gravel Co., 300 Condon street, East Boston, is planning for the installation of an electrically-operated coal hoist and tower, with bucket about 1½ yd. capacity.

Superior Sand and Gravel Co., Dime Bank building, Detroit, will erect a new plant at 431 Lycaste street, to cost \$35,000 including conveying, screening and other equipment.

Union Rock Co., Los Angeles, Calif., has let the contract for its new rock crushing plant and sand and gravel washing plant to Wheeler & Co., of Los Angeles, for \$37,500 plus \$75 a ton for steel.

The A. C. Flint Gravel Co., of Arkansas City, Kansas, has purchased the gravel pit and stone quarry of the Silverdale Stone Co. The purchasers have been in possession for some time and are making extensive improvements.

Ladwig Sand and Gravel Co., and the Otto Ladwig Block Co., of Milwaukee, Wis., announce the removal of their offices to their concrete block plant on Green Bay road near Adams avenue. Postoffice address is R. R. 6, Station C, Box 49A.

Houston, Texas, road material specifications were recently criticized by the mayor because the specification for gravel did not set a limit to the amount of sand the gravel might contain. He forbade the purchase of any more gravel under this specification.

Gemmer & Tanner, of Houston, Texas, producers of gravel and concrete products, have moved to more commodious quarters at 807 First National Bank building. The change is location was made necessary by the increasing business of the firm. The business was formerly located at 201 Scanlan building.

Burt Core Sand Co., Detroit, Mich., has elected Warren R. Thompson, pres.; R. J. Mehlman, vice-pres.; F. J. Snyder, treas.; and J. E. Love, sec. During the year just closed the company installed apparatus for mixing, cleaning and screening all sand, and a very satisfactory volume of business is reported.

More than 500 carloads of sand and about double this amount of gravel will be required by the Utah Power & Light Co., in the construction of the big power dam at Alexander, Idaho. The Dingle district will supply a considerable amount from the gravel beds there. Twelve to fifteen teams are already hauling gravel from this district.

Cement

Marquette Cement Co. had an accident recently at its quarry in Cape Girardeau, Mo., in which one man was killed and three severely injured. The cause of the accident was the drilling into an unfired charge in an old hole in the quarry.

Great Western Portland Cement Co., Kansas City, has elected Luis Rosner, general sales manager, and A. B. Nielson, general superintendent. The other officers of the company were re-elected recently at a meeting of the stockholders. They are L. L. Seibel, president; Page Golsan, vice-president, and William Volker, secretary and treasurer.

Gilmore City (Iowa) Cement Corp. held its annual meeting and election of officers recently and the concern was shown to be in prosperous condition. The production for the past 10 months totaled 314,000 bbl. Plans are being made to increase the capacity of the plant and install new kilns and also the capacity of the dryer and grinding apparatus.

Enough rock to supply the cement plant of Metaline Falls for one year was gained when officials of the company recently discharged a \$10,000 blast, in which 36,400 lb. of dynamite were utilized and 96,000 tons of rock torn from a hillside near the town. A new process of drilling and discharge was used to shear the rock from the remaining walls, which eliminated the jagged and irregular cliff usually left following the blast. To accomplish the feat it was necessary to drill holes perpendicularly into the rock for depths ranging from approximately 100 to 150 ft., at intervals of about 30 ft.—Spokane, Wash., Farmer.

Quarries

The Libby Rock Quarry, Pangburn, Ark., has been making improvements and expects to begin operations soon. The crushed rock is to be used for highway purposes.

Biesanz Stone Co., Winona, Minn., has finished a new plant, capable of furnishing the entire output of their travertine stone quarry, which is connected with the quarry by cable tram cars.

Work will be commenced at an early date to put the Negaunee, Minn., municipal crushing plant in shape to handle a maximum output for road and street building in 1924.

Cleveland (Ohio) Stone Co. director J. E. Wade has resigned and is succeeded by his son, Garretson G. Wade. Other directors were re-elected at the annual meeting but there is now a vacancy owing to the death of George H. Worthington, former president of the company.

McDermott Stone Co.'s plant at McDermott, Ohio, was practically destroyed by fire January 14. It will be rebuilt at once, but whether it will be in the market for new machinery and power plant equipment will depend upon the condition of present equipment.

A 20-acre tract near 31st street and Raytown road, Kansas City, on which they have been conducting a rock quarrying operation for more than five years, has been bought by John Halpin and William Dwyer for \$13,000. The seller was Mrs. Anna P. Tanner. The land, it is said, ultimately is intended for a subdivision project.

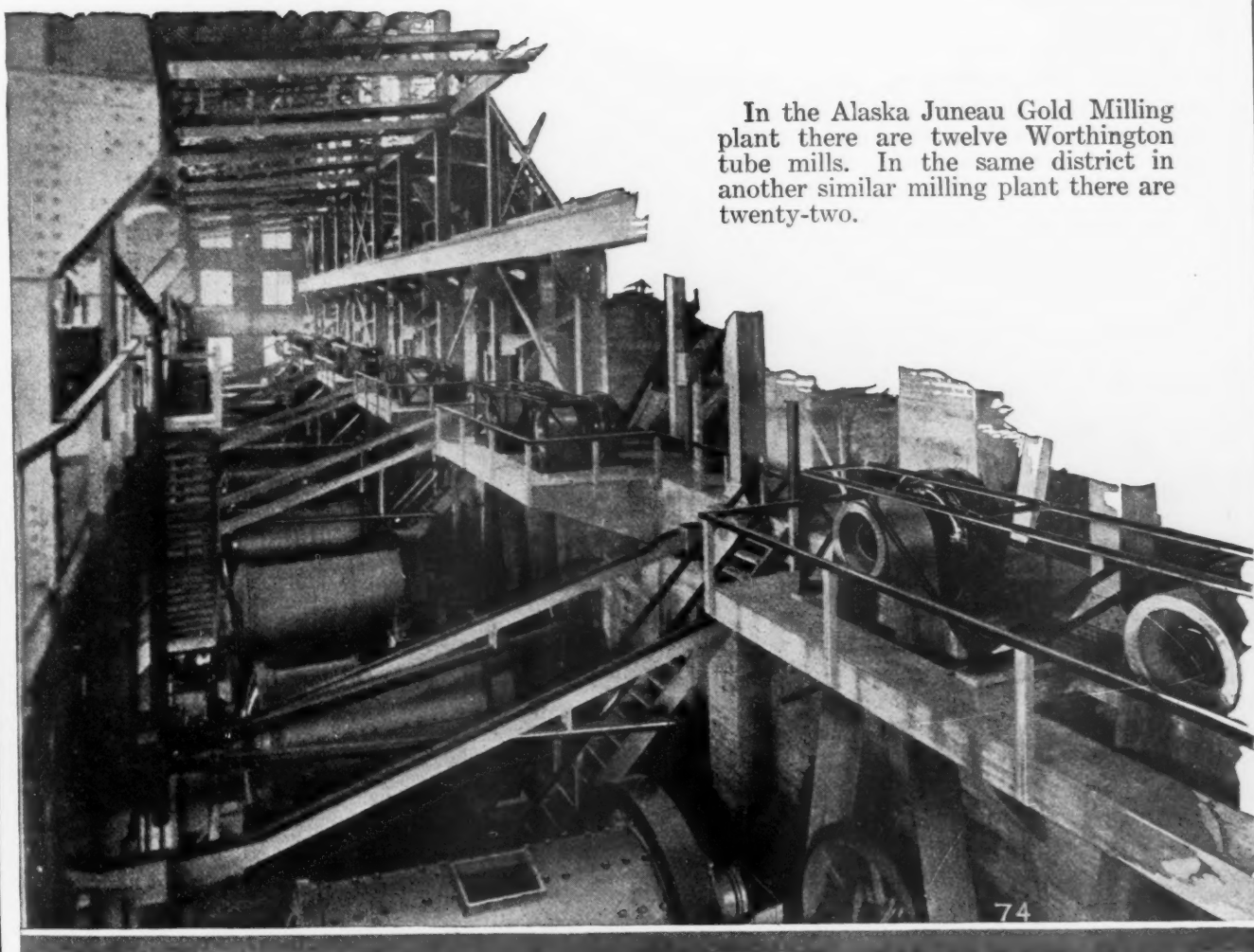
Standard Lime and Stone Co., Fond du Lac, Wis., has elected the following: Pres. and treas., W. A. Titus; vice-pres., Alfred Frerk, Chicago; sec., C. Czarnecki. Reports of the officers indicated that the company increased its volume of business in 1923, and that prospects are for still further trade expansion the coming year.

Duncansville (Pa.) Lime and Limestone Co., Inc. will be increased from approximately 100 tons of crushed stone per day to approximately 300 tons within the next few weeks. In addition to the crusher to be placed, it is stated that other modern stone machinery will be placed in operation. In order to expedite rail shipments, it is planned to extend a sidetrack from the Pennsy to the quarry.

Thomson Bros. Rock Co., Kansas City, Mo., has assembled from Daisy Silvey, Blue Bank Realty Co. and J. W. Couch, a tract of 25½ acres of ground lying between 53rd and 55th

(Continued on page 64)

Twelve Worthington Tube Mills in This Plant



In the Alaska Juneau Gold Milling plant there are twelve Worthington tube mills. In the same district in another similar milling plant there are twenty-two.

WORTHINGTON PUMP AND MACHINERY CORPORATION

Executive Offices: 115 Broadway, New York City. Branch Offices in 24 Large Cities

W-231.8

WORTHINGTON

Deane Works, Holyoke, Mass.
Blake & Knowles Works
East Cambridge, Mass.
Worthington Works
Harrison, N. J.
Laidlaw Works, Cincinnati, Ohio.

Hazleton Works,

Hazleton, Pa.



Gas Engine Works, Cudahy, Wis.
Power & Mining Works
Cudahy, Wis.
Snow-Holly Works
Buffalo, N. Y.
Epping-Carpenter, Pittsburgh, Pa.

When writing advertisers please mention **ROCK PRODUCTS**

streets, Elmwood avenue and the Frisco Railroad Co.'s right-of-way. It is estimated that there is 850,000 tons of rock on this property and that when this has been removed there will be developed 18 acres of switch property.

Walter and Irvin Matthews, Bloomington, Ind., have bought one-half interest in the Mathers Stone Co. quarry, southeast of Clear Creek. The price paid was given as \$100,000. With their brother, Frank Matthews, the new purchasers already own the Crescent Stone quarry.

The greater portion of the crushed rock that is to go in the hard-surfaced road between Tulsa, Okla., and Drumright, will be crushed at the Oilton quarry, just east of the city, and located directly on the Albert Pike highway. It is the only limestone quarry in the county, and it is reported that all of Monitor hill, on which the crusher is located, is composed practically entirely of limestone. It is nearly three miles long and engineers state that there is enough rock in this hill to pave all the roads in Oklahoma.

Basalt Rock Co. stockholders held their annual meeting at the offices of the company in Napa, Calif., on January 21. The following officers were unanimously elected to succeed themselves for the year of 1924: L. J. Alexander, president; A. G. Streblov, vice-president, and D. R. Bruce, secretary-treasurer. An announcement was made by the president to the effect that a dividend of 25 per cent be declared on all stock outstanding on the books as of December 31, 1923, based upon the operations of the company for 1923.

Concrete Products

Birmingham Hollow Tile Co.'s plant, Avenue C and 24th street, Birmingham, Ala., has been destroyed by fire.

Wm. K. Brinkley and Benny Cross have been looking over Pomona, Calif., with a view to establishing a concrete tile factory at that point.

Terre Haute (Ind.) Concrete Products Association has been formed by the manufacturers of Terre Haute for publicity and promotional work.

Lansing (Mich.) Cast Stone Co. has been operating its plant all winter at full capacity to accumulate a stock for the coming season. Edward B. Ramsey has been re-elected president by the board of directors.

Houghton Cement Block Co. has practically completed a branch plant at Columbus, Ohio, which will have a capacity of 1,000,000 blocks a year. The plant is 50x90 ft. in dimensions and will cost when completed, approximately \$20,000. It is probable that another branch plant will be established at Zanesville, Ohio, within the next 60 days.

Lime

White Star Lime Products Co., of Gibsonburg, Ohio, has received 26 carloads of steel for its new plant.

Luckey (Ohio) Lime and Supply Co. has elected the following directors: C. C. Martin, L. B. Martin, F. H. Claus, F. W. Williams, W. F. Miller, W. L. Kinsting and H. W. Nieman.

Much activity is noted at the limestone quarries at Ingleside, Colo., the Colorado & Southern railroad being required to haul some 60 cars of limestone a week on the branch to Ingleside. The limestone is used by the Great Western Sugar Co. and the local output is used at the factories at Loveland, Longmont, Eaton, Brighton and Fort Collins. At this season of the year the company puts in its supply for the operating period which comes in the latter part of the year.

Silica Sand

Federal Refractories Co., Rockefeller building, Cleveland, with plant at Alexandria, Pa., has closed a contract with the state for ganister rock production in Huntingdon county forest reserves, and will establish a mining plant, with power house, for early operations.

Rock Asphalt

The chamber of commerce of Webb City, Mo., has appointed a committee to investigate the possibilities of making asphalt road building material from mining waste in this section of the state. Several tests of the new road building material already have been made at Joplin and they have been said to be entirely satisfactory.

Phosphate Rock

West Virginia Chemical Co., Fairmont, W. Va., manufacturer of fertilizer products, etc., has plans for an addition on the Tygart's Valley river, with electric power department. It will cost about \$75,000. W. C. McAdoo is general manager.

New Orleans.—That Louisiana farmers are learning the lesson of co-operation is shown by a recent deal when 10,000 tons of acid phosphate was brought here through the Louisiana Farm Bureau Federation, and is being distributed to farmers throughout the state.

According to State Mining Inspector, Stewart Campbell, Idaho has the largest, high grade deposit of phosphate rock in the world, located in southeastern Idaho. It occupies more than 3000 square miles, or one and a quarter million acres, in Caribou, Bear Lake, Bingham and Teton counties. "The total reserves mineable exceed 5,500,000,000 tons. It is the greatest and most valuable mineral deposit in the world."

Asbestos

Idaho-Montana Asbestos Co. stockholders held the annual meeting at Twin Falls in the latter part of January. The following were elected: T. E. Wood, president; H. H. Scarborough, treasurer and secretary; Carl W. Peterson, vice-president. These officers, together with the following, compose the directorate: A. C. Miner, F. W. Caldwell, H. E. Poole, and Ezra J. Merrill. The company is equipping the mine with up-to-date machinery for separating the fibre from the rock and making it one of the largest producers of asbestos in the northwest.

Agstone

The Madison County (Ill.) Farm Bureau has just received a price of \$1.65 per ton on agricultural limestone delivered to any station in Madison County. This price is available to farm bureau members on orders placed through the bureau before March 15.

Gypsum

American Gypsum Co.'s block and plaster board plant at Port Clinton, Ohio, was burned recently. The loss is placed at \$15,000.

Magnesite

Magnesite Products Corp. has leased the land and building at 512 South Alameda street, Los Angeles, Calif., and will manufacture magnesite building material, such as flooring, stucco and marine decking.

Trade Notes

English Brothers Machinery Co. is the new name of the English Tool & Supply Co., Kansas City, Mo.

Ingersoll-Rand Co., 11 Broadway, New York City, offers a new type riveting hammer, which is said to have less "kick back" than usual and to consume less air.

The Pawling & Harnischfeger Co., Milwaukee, is taking bids through Frank D. Chase, Inc., 645 North Michigan avenue, Chicago, for the construction and equipment of a steel foundry, 183x374 ft., one story, of brick and steel, as an extension of its main works at 38th and National avenues. Arthur G. Henricks is vice-president and general manager.

Obituary

Richard A. Scanlon, president of the Lenox Sand and Gravel Co., died January 19 of heart disease at his home, 112 Iden avenue, Pelham Manor, N. Y., in his forty-fourth year.

Personal

S. Ralph Andrews, president of the Charlestown Sand and Stone Corp., also the Broadcreek Construction Co., of Elkton, Pa., was taken to a Baltimore hospital for a serious operation.

P. G. Paris, director of the Westport Mill, investigation and testing laboratory of The Door Co., engineers, has resigned to return to the Bethlehem Steel Co., with whom he was formerly affiliated. He will be connected with the patent and research department and will be a consultant on ordnance work. The directorship of the Westport Mill will be taken over in the near future by J. A. Baker, who was formerly connected with The Door Co. Mr. Baker, who prepared at Sheffield Scientific School and the Colorado School of Mines, has had a wide experience in mining and metallurgical work.

Trade Literature

Dorr Co., New York, has issued Bulletin No. 22, dealing with the Dorr Slurry Mixers.

Osgood Company, Marion, Ohio, has just issued Circular No. 237, describing its material handling equipment.

Macwhyte Co., Kenosha, Wis., issues a catalog of its wire rope which will answer almost any question in regard to that product.

Brown Instrument Co., Philadelphia, Pa., issues a circular on Temperature Control, the solution to many difficult and unusual temperature problems.

Bucyrus Co.'s new bulletin, F-302, describes the company's Diesel and gasoline shovel No. 30B and gives very complete details of its design and construction.

Easton Car and Construction Co. has issued a new Bulletin, No. 4, describing Won-Way cars. There are excellent illustrations of the use of these cars in quarry practice.

"Every Good Road Lightens the Load," is the slogan with which the Good Roads Machinery Co., Kennett Square, Pa., adorns the cover of its new circular describing road graders.

Milwaukee Locomotive Mfg. Co., Milwaukee, Wis., has issued a handsome catalog describing its gasoline locomotives, types H3 to H7, in weights running from 3½ to 7 tons.

Blaw-Knox Clamshell Buckets is the title of Catalog No. 24 of the Blaw-Knox, Blawnox, Pa. It is exceptionally well designed and printed and contains just the information that a prospective bucket buyer needs.

Quarry Car Practice, Part Four, issued by the Easton Car and Construction Co., Easton, Pa., contains a series of most interesting quarry views. A good deal of modern quarry practice may be learned from a study of these pictures.

Austin-Western Road Machinery Co., 400 N. Michigan boulevard, Chicago, issues Catalog No. 24 describing the entire line of Austin-Western machinery. Many machines are brand new and were first seen in this year's Good Roads Show.

Pennsylvania Crusher Co. issues Bulletin 1014 illustrating and describing Pennsylvania Steel Built Hammer mills. These mills have been in use for 25 years for the secondary reduction of cement rock, limestone, gypsum rock and similar materials.

Hill Clutch Co.'s (Cleveland, Ohio) Power Transmission Machinery is a bound book beautifully printed and illustrated. It is evidently intended to be preserved, as it should be, for a reference work to be consulted when power transmission problems come up.

Sauerman News in its January number publishes an interesting account of the Waukesha Washed Sand and Gravel Co.'s plant at Okauchee, Wis., in which both cableway and belt conveyors are used in conveying gravel from the pit to the washing plant.

LINK-BELT COMPANY STILL FURTHER REDUCES PRICE ON PORTABLE BELT CONVEYOR

A concrete instance of what production can mean in the matter of selling price comes from the Philadelphia plant of the Link-Belt Co., where the "Cub" portable loader has been placed on a production basis and where, as a result, an initial reduction in price of over 16 per cent was made. The machine formerly sold for \$700, but placing it on the new manufacturing basis first brought the sale price down to \$585, then to \$550.

Now, with the popularity of the machine thoroughly proved, the Link Belt Co. still further reduces the price of this portable belt conveyor, equipped with a two or three phase, 60 cycle motor and fitted with the underneath raising and lowering mechanism to \$485.

The Only Journal With a Paid Circulation in the Rock Products Industry

Rock Products

Established

1912

VOLUME XXVII, No. 4

CHICAGO

FEBRUARY 23, 1924



Haul 1400 Tons on 12 Gallons of Gas

Sand and gravel production by modern methods demands rapid, economical haulage. Profits are made by hauling the most material in the least time for the least money. That's why Plymouth Locomotives are profit earners. They pick up loads and hurry. They cost less to operate and less to maintain than any other type of motive power.

The Bennett Gravel Co. were using a 14 ton steamer. Their haulage was slow and expensive. Then a light dawned. They installed a 7 ton Plymouth. Read their letter—then write us for Catalog and Bulletins showing many other users.

THE FATE-ROOT-HEATH CO.

210 Riggs Avenue

Plymouth, Ohio

BENNETT GRAVEL CO.,
Spring Lake, N. J.

Jan. 9, 1924.

The Fate-Root-Heath Co.,

Plymouth, Ohio.

Gentlemen: We are hauling 1400 tons per day, $\frac{1}{4}$ of a mile, over $\frac{1}{2}$ of 1% grade, with a Plymouth 7-ton Gasoline Locomotive.

The advantages we find in using gas over steam power are as follows:

1. We do not require a licensed engineer.
2. We do not have to provide water.
3. We get away from boiler troubles.
4. We require no extra man to get up steam ahead of time.
5. Our fuel cost as compared with coal for a 14-ton steamer to do the same work, is only about 12 gal. of gasoline per day, as against about one-half ton of coal.
6. We are relieved from hauling coal, which had to be done by a team, and the cost of hauling this coal was nearly as much as the total cost of gasoline.

The Plymouth has taken care of its job continuously and given very satisfactory service.

Yours very truly,

BENNETT GRAVEL CO.,
(Signed) By E. W. Braly.

PLYMOUTH

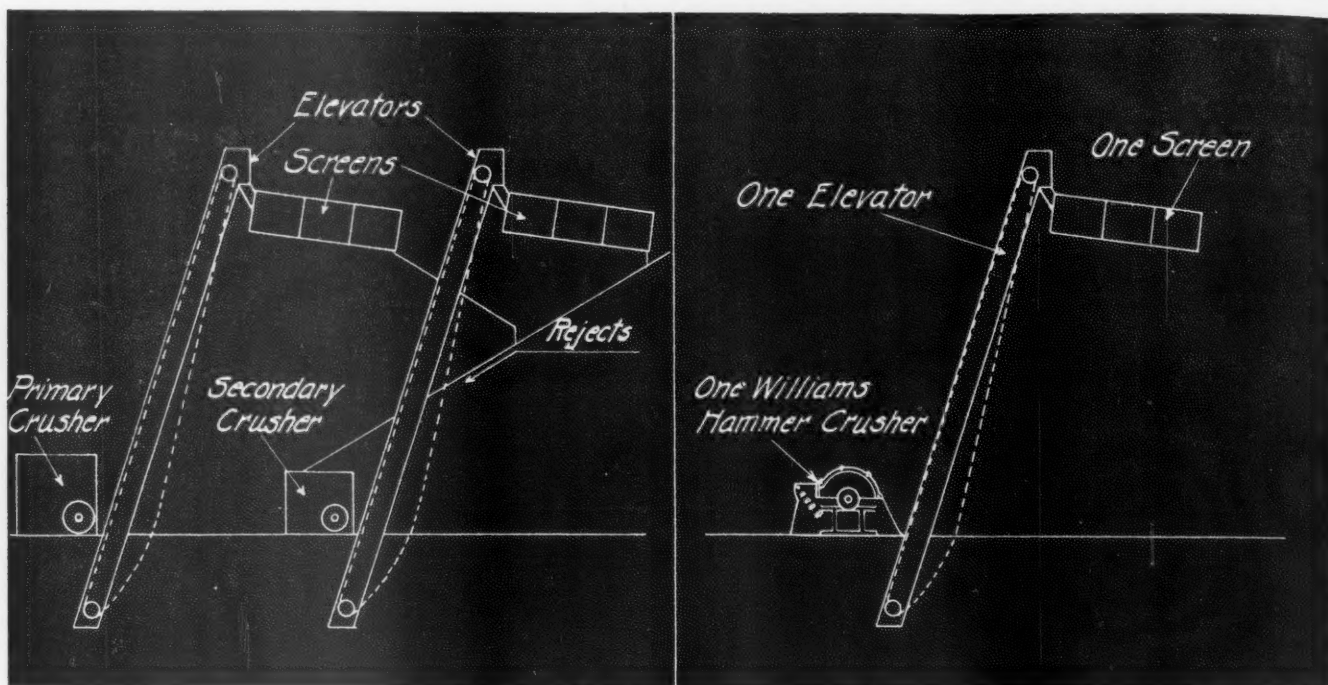
Gasoline Locomotives

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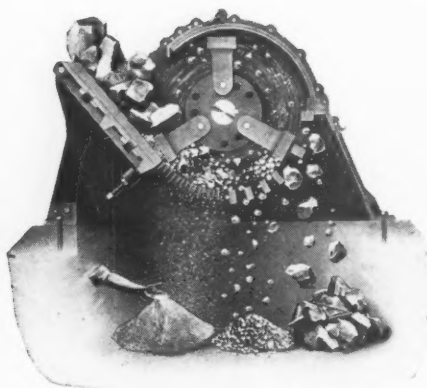
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Why Operate Two Crushers When One Does the Work?



X-ray view of Hinged Hammer Principle. Illustration shows how any size material can be made by proper adjustment.

"One No. 3 Williams Hammer Mill has replaced two gyrators in making 1½" macadam. Plant capacity doubled and crushing costs reduced one half."

Jacksboro Crushed Stone Co.
Jacksboro, Texas.

The Jacksboro Crushed Stone Co. installation, Jacksboro, Texas, is a typical example of how one Williams crusher, by handling larger rock and reducing to the required size in one operation, does the work of 2 or 3 other crushers with incidental equipment.

Cuts Operating Cost 50%. By doing away with one crushing operation, much handling, supervision, etc., crushing costs per ton have been cut approximately 50%.

One-Half the Investment. Requiring less actual crushing machinery, fewer elevators, screens, conveyors, drives and smaller buildings, Williams equipped crushing plants can be erected for one-half the investment required by other types.

Adaptable to Any Kind of Crushing. Williams Hammer crushers can be applied with equally good results to any kind of crushing, whether for cement, macadam or limestone for kiln burning. Write for service records in nearby plants on work similar to yours.

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